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MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

See also p. 1372, Brumpt & Brumpt, Résistance au paludisme et hémoglobines anormales (en particulier hémoglobine E). [**Resistance against Malaria and the Abnormal Haemoglobins (especially Haemoglobin E)**]

Bruce-Chwatt, L. J. **Parasite Density Index in Malaria.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, July, v. 52, No. 4, 389.

In this note, Bruce-Chwatt states that the calculation of the Parasite Density Index [this *Bulletin*, 1951, v. 48, 710] used in Nigeria since 1951 has been slightly amended recently. The 10 classes of parasite counts now present a geometrical progression, by a factor of 2, throughout the whole scale: this is much sounder mathematically than the previous rather uneven distribution of arbitrarily chosen limits of these classes. The new scale is as follows:

Parasite count per cmm.	Less than 100	101–200	201–400	401–800	801–1600	1601–3200	3201–6400	6401–12800	12801–25600	25601 and over
Class	1	2	3	4	5	6	7	8	9	10

The index is calculated as before by weighting the frequency of individual parasite counts falling within the range of each class by the class number: the sum of these weighted frequencies is then divided by the number of positive smears.

This new method gives slightly higher values than the old: this is more obvious where there is a high proportion of heavy infection in the sample,

but the difference rarely exceeds the first decimal point in series of about 100 positive smears. *H. J. O'D. Burke-Gaffney*

Aragão, M. B. Aspectos climáticos de problema bromélia-malária. I—Distribuição geográfica dos anofelinos do sub-gênero *Kerteszia* no Brasil. [**Climatic Aspects of the Bromelia-Malaria Problem. I—Geographical Distribution of Anophelines of the *Kerteszia* Sub-Genus in Brazil**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Oct., v. 8, No. 4, 621–31, 6 figs. [23 refs.] English summary.

After a brief historical review of the bromelia-malaria problem in Brazil the author discusses the geographical distribution of the sub-genus *Kerteszia* and its relationship to the factors of temperature and rainfall. From this study it was found that the sub-genus was most abundant in regions of mountainous relief, which provided the conditions of rainfall from the Atlantic Polar air mass, and therefore also of abundant growth of bromelia. *E. R. Nye*

Husain, M. Z. Y., Hena, A. & Lasker, M. I. **Therapeutic Trials on a New Anti-Malarial Drug "Azacrine".** *Pakistan Med. J.* 1958, May, v. 9, No. 5, 5–8.

Azacrin, a synthetic antimalarial of the acridine group, resembles mepacrine in colour and in bitterness of taste. It is prepared in tablets of 100 mgm. The authors carried out a therapeutic trial on 45 patients at Dacca, East Pakistan, of whom 22 were infected with *P. vivax*, 19 with *P. falciparum*, 1 with *P. malariae* and 3 with both *P. vivax* and *P. falciparum*. The dosage used was 4 tablets (400 mgm.) on the first day followed by 2 tablets (200 mgm.) on each of the 2 succeeding days.

The drug appeared to be an effective schizonticide, and was free from important side-effects. Patients suffering from *P. vivax* infections became afebrile after a mean interval of 29·8 hours [presumably from the time of administration of the initial dose], those with *P. falciparum* infections after 32·9 hours, while those with mixed infections were apyrexial after 36 hours. Parasitaemia subsided after mean intervals of 54·9, 49·0 and 66·5 hours in the case of *P. vivax*, *P. falciparum* and mixed *vivax* and *falciparum* infections respectively.

Though no recrudescences were observed in cases of *P. falciparum* infection, a single relapse at 91 days was recorded among the 22 *P. vivax* infections. The duration of observation after treatment is not recorded, however.

[Azacrin appears no more efficient than mepacrine and is even more unpleasant to the taste.]

[For earlier trials, in Africa, see this *Bulletin*, 1953, v. 50, 477; 1954, v. 51, 674.] *J. H. Walters*

Jindal, M. N. & Joseph, A. D. **A Note on the Effect of Amodiaquin on Cardiovascular Responses of Adrenaline, Noradrenaline and Acetylcholine.** *Indian J. Med. Res.* 1958, July, v. 46, No. 4, 602–5, 1 fig.

[See this *Bulletin*, 1957, v. 54, (392).]

Russell, P. F. **World-Wide Malaria Eradication.** *Indust. Med. & Surgery.* Chicago. 1958, Aug., v. 27, No. 8, 378–83.

Pek, R. A. **Rice Fields and the Malaria Problem in Turkey.** *Bull. Endem. Dis.* Baghdad. 1958, Jan., v. 2, Nos. 3/4, 94–9, 1 map & 1 chart.

In 1924 there was a violent epidemic of malaria in Turkey and a resultant attempt to prohibit rice growing on account of the innumerable anopheline breeding places it creates. The law was unenforceable, but strict control over rice fields is still maintained. Any field less than 3 km. from human dwellings must be allowed to dry completely every 10 days. In practice, drying is never complete enough to cause total extermination of breeding forms. Before 1945, Paris green was used as larvicide. Since then, various preparations of DDT, BHC and dieldrin have been used, but complete sterilization of the plots and main canals has never been achieved.

As a result of a residual spraying campaign, DDT 2 gm. per square metre thrice yearly, and medical care to all malaria sufferers, it can be said that rice cultivation in Turkey has ceased to be a potential danger to the public health. Malaria-carrying anophelines found in the rice fields are: *A. sinensis*, *A. maculipennis typicus*, *A. m. messeae*, *A. sacharovi*, *A. algeriensis* and, to a lesser extent, *A. superpictus*. *A. superpictus* and *A. sacharovi*, the most dangerous vectors in Turkey, as yet have shown no resistance to chlorinated hydrocarbons. *B. B. Waddy*

LaBrecque, G. C., Gahan, J. B. & Adcock, P. H. **Residual Effectiveness of Six Organophosphorus Compounds against** *Anopheles quadrimaculatus* **Say.** *Mosquito News.* 1958, June, v. 18, No. 2, 94–5.

In view of the increasing number of instances of resistance to the chlorinated insecticides, it seemed desirable to evaluate some of the safer organophosphorus compounds as residual insecticides for control of anopheline mosquitoes. Six of these organophosphorus compounds were tested in comparison with DDT, by spraying them on to plywood panels (at 100 mgm. per sq. ft.) and exposing batches of *Anopheles quadrimaculatus* adults to the residues, for various periods, at different intervals after treatment.

The results indicated that malathion was equal or superior to DDT

throughout the 180-day test period. Diazinon was even more effective for the first 14 days, about equal to malathion for 30 to 60 days and rather less effective thereafter. Dow ET-57 was also more effective than malathion for 14 days, but much less active thereafter. Dicapthon (Am. Cyanamid 4124) was rather less effective than malathion, but appeared to be nearly as persistent. Chlorthion and dipterex were somewhat less effective at the rate used. *J. R. Busvine*

McNeel, T. E. **Dieldrin Formulations on Mud Walls in Mexico.** *Mosquito News.* 1958, June, v. 18, No. 2, 81–5.

Field trials of dieldrin for malaria control are under way in three districts of Mexico, with the joint collaboration of the Pan American Sanitary Bureau, the Mexican Government and the Shell Company. Houses have been sprayed in groups of villages at rates from 25 to 100 mgm. dieldrin per sq. ft., to control the vectors *Anopheles albimanus* and *A. pseudopunctipennis*. In some houses, a special dieldrin formulation was used; this contained resins to prevent the deactivation due to absorption which may occur on mud walls [see Burnett, this *Bulletin*, 1958, v. 55, 251]. Effectiveness is being judged by house inspections, by "wall tests" and chemical estimation of residues. So far, judging mainly by wall tests, there has been no evidence of rapid deactivation. Houses treated at 25 mgm./sq. ft. are still insecticidal up to 300 days. Higher doses seem to be even more effective, though not in proportion to the extra quantities used. *J. R. Busvine*

Pinto, G. de S. Sôbre a conveniência e oportunidade da interrupção das medidas anti-anofelínicas, em algumas zonas de malária. [**Convenience and Opportunity of Interrupting Measures against Anophelines in Some Malarious Areas**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Oct., v. 8, No. 4, 617–20. English summary.

Complete eradication of the malaria vector, *Anopheles tarsimaculatus*, by house spraying, since 1948, was found to have occurred between the years 1952 and 1955 in a few seaboard areas of São Paulo. Non-vector species persisted but it is felt justifiable to suspend malaria control measures providing a check is maintained to detect any return of the vector. *E. R. Nye*

Deegan, T. & Maegraith, B. G. **Iron Metabolism in Malarial Infection: Tracer Studies of Iron Metabolism in Rats infected with** *Plasmodium berghei* **Malaria.** *Ann. Trop. Med. & Parasit.* 1958, July, v. 52, No. 2, 232–46, 1 fig. [27 refs.]

Two pigments are deposited in tissues during malarial infection: the malarial pigment (haemozoin) [this *Bulletin*, 1956, v. 53, 1313, 1314]

and haemosiderin, which gives a blue colour with Perl's stain. The distribution of these substances in rat tissues was followed during infection with *Plasmodium berghei*. Experiments were also made to determine the availability of this iron and the change in the content of the element in the various tissues. For this purpose ^{59}Fe with carrier was given to normal rats under normal conditions and after infection with *P. berghei*. The distribution of the isotope was followed at the peak of infection, when recovery seemed to have occurred, as judged by reticulocyte count, and again sometime after this stage.

Male rats of 200 gm. were maintained at 68–72°F. and fed on a standard diet with unlimited water for 10–14 days before infection and during the experimental period. A standard inoculum of 1 μC. of ^{59}Fe was given subcutaneously along with the non-active isotope to a total of 1 γ Fe. At intervals after inoculation the normal and infected rats were bled out completely by perfusion. Erythrocyte counts were made and the packed cell volume (PCV) determined. ^{59}Fe was assayed in liver, spleen, kidneys and bone marrow. Radio-active measurements were made in a well-type scintillation counter.

The results indicated that equilibrium of administered iron was attained in normal animals in 10–20 days. Comparisons of the distribution of ^{59}Fe in normal rats and those infected with *P. berghei* are given in a table. The content of ^{59}Fe in the blood fell during infection and rose again on recovery. In the liver there was a marked increase in ^{59}Fe content of the infected compared with that in control animals, with return to near normal on recovery. Perl's stain did not give a colour characteristic of unbound iron but malarial pigment was present. There was a very marked increase of ^{59}Fe content of spleen during infection in which Perl's stain gave a characteristic blue colour and malarial pigment was abundant. In the kidneys the isotope content varied widely, while in the bone marrow there were indications of an active iron turnover.

The significance of these findings is discussed from the point of view of the factors which exert an influence on the distribution of body iron at different stages of the malarial infection and subsequently.

J. D. Fulton

Taylor, Angela E. R. **The Effects of Cod-Liver Oil and Vitamin E on Infections of** *Plasmodium gallinaceum* **and** *Treponema duttoni*. *Ann. Trop. Med. & Parasit.* 1958, July, v. 52, No. 2, 139–44, 2 figs.

It has been shown by Godfrey [this *Bulletin*, 1958, v. 55, 485] that a diet rich in cod-liver oil suppresses infections of *Plasmodium berghei* and other protozoa in mice; this suppression is prevented by giving vitamin E. The present paper shows that these diets have the same effects upon infections of *P. gallinaceum* in chicks, and also (to a slight extent) upon infections of *Spirochaeta duttoni* in mice. It is believed that the unsaturated fatty acids of cod-liver oil are oxidized by the host

to peroxides which are unfavourable to the parasites; vitamin E is an anti-oxidant and can prevent this peroxidation. *F. Hawking*

Corradetti, A. & Verolini, F. Azione della splenectomia nell'infezione da *Plasmodium rouxi* nei canarini. [**Effect of Splenectomy on *Plasmodium rouxi* Infection in Canaries**] *Riv. di Parassit.* Rome. 1958, Jan., v. 19, No. 1, 21–8. English summary (6 lines).

In addition to morphological characters, *Plasmodium rouxi* differs from other avian malaria parasites in that it produces a continuous infection, with low parasitaemia, lasting for the rest of the host's life. Experiments described in this paper were undertaken to determine the effect of splenectomy on the course of infection with this parasite.

Of the 36 canaries used in this work, (1) 18 served as controls, (2) 10 were splenectomized at periods from 23 to 63 days after parasites appeared in the blood, while (3) 8 birds underwent splenectomy from 3 to 25 days before inoculation of the parasites. The results of these experiments—shown in 4 tables—were as follows. In the second group the survival time of the splenectomized birds was reduced to an average of 73 days, as compared with upwards of 136 days in the control group. In the third group the incubation period was shortened by about one-third of that in the controls (the averages for these groups being 12·75 and 21·71 days, respectively). As the result of splenectomy, a rise of parasitaemia occurred in 5 out of 10 birds of the second group and in 5 out of 8 in the third. In 4 birds there was a progressive increase up to the time of death, while in 6 it was only transitory (7–30 days). On the other hand, in 7 cases of both groups (2 and 3) splenectomy had no effect upon the normal course of infection. *C. A. Hoare*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:*—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Robertson, D. H. H. & Baker, J. R. **Human Trypanosomiasis in South-East Uganda. 1. A Study of the Epidemiology and Present Virulence of the Disease.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, July, v. 52, No. 4, 337–48, 4 figs. [22 refs.]

Trypanosoma gambiense carried by *Glossina palpalis* caused the great lakeside epidemic of sleeping sickness at the beginning of the century.

The disease persisted in low endemic form until 1933, after which no cases were reported until 1939. During 1940–1943, an epidemic occurred in Busoga, in which *T. rhodesiense* carried by *G. pallidipes* was incriminated [this *Bulletin*, 1945, v. 42, 13]. The disease has persisted with an annual incidence of from 10 to 97 cases. Since 1956 cases have been investigated fully; 2 groups of cases are described, occurring respectively in September 1956–April 1957 and May–June 1957. In the first group (72 cases) there were 2 main foci of infection, Sigulu Island on Lake Victoria and around Lugala, including a stretch of much travelled road, the habitat of *G. pallidipes*. Lugala's population increased from 32 persons in 1953 to 88 in 1957. Some of the new settlers came from far and tended to revisit their old homes from time to time. There was in addition a shifting population of fishermen. Movements of both groups could spread sleeping sickness. 91% of patients were men; 64% were concerned with the fish trade and many of the rest were infected during casual visits to buy fish at Lugala. 6% were women and 3% children. All except 1 case were of *T. rhodesiense* infections. In the second group of cases, 28% were women; only 31% of the males were in the fish trade, 54% being farmers. In this period the majority of people were infected in their villages; the rains had been abnormally heavy and this probably resulted in an unusual increase in the numbers and range of *G. pallidipes*. The bush along the suspected road was sprayed with dieldrin in June, but the results of this operation have not yet been assessed.

Strains of trypanosomes were isolated from patients by inoculation of white rats, and from infected *G. pallidipes*. All were *T. rhodesiense*, but virulence varied considerably. Great variation in the proportion of stumpy and posterior nucleated forms was noted. Almost all were absolutely resistant to tryparsamide. Patients free from symptoms, 1 of them apparently a healthy carrier, were seen. In general the virulence of a strain, as determined by animal inoculation, was not related to the severity of the symptoms in man. Transmission appeared to be man–fly–man, with the game reservoir unimportant. Asymptomatic cases and those relapsing after antrypol therapy are thought to constitute the main reservoir.

G. pallidipes is the major vector, though *G. palpalis* may play a minor part. The former bites preferentially on the legs, and 26 out of 34 trypanosomiasis chancres seen were below the knee. *G. palpalis* was not found infected in nature. *B. B. Waddy*

Ashcroft, M. T. **An Attempt to isolate *Trypanosoma rhodesiense* from Wild Animals.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 276–82, 1 map. [15 refs.]

Although there is considerable circumstantial evidence that wild animals serve as reservoir hosts of human trypanosomiasis due to

Trypanosoma rhodesiense, this trypanosome has never been actually isolated from wild game. In this paper the author describes attempts to fill this gap in our knowledge by recovering the trypanosomes in question from animals shot in two localities of Tanganyika, where the epidemiological situation suggested that animals—rather than man—were the sources of human infection. In the course of this investigation, 74 animals were shot, the blood of each was examined for the presence of trypanosomes and inoculated into rats, which were kept under observation for 90 days.

Among the 27 animals from Ugalla river area (Tabora District) none was found harbouring any trypanosomes of the *brucei* group, but among the 47 from Babati area (Mbulu District) infection with these trypanosomes was detected in a hartebeest (*Alcelaphus cokei*). This strain was isolated and maintained in rats, from which citrated blood (containing 4 and 6 million parasites) was inoculated into 2 African volunteers. These remained in good health, without fever or local reaction; they never showed any trypanosomes during one month (after which they were treated with drugs), and rats subinoculated from them failed to become infected. It was, accordingly, concluded that the infection in the antelope was due to *T. brucei*.

However, in view of the strong experimental and epidemiological evidence in favour of regarding wild animals as sources of human infection, which is discussed at some length, the author does not think that this single failure invalidates the generally accepted hypothesis.

C. A. Hoare

Fairbairn, H. & Godfrey, D. G. **The Local Reaction in Man at the Site of Infection with** *Trypanosoma rhodesiense*. *Ann. Trop. Med. & Parasit.* 1957, Dec., v. 51, No. 4, 464–70, 10 figs. on 3 pls. [10 refs.]

In their study of the initial development of *Trypanosoma rhodesiense* in cyclically infected guineapigs, Gordon and Willett [this *Bulletin*, 1957, v. 54. 270] have shown that the metacyclic forms entered the general circulation shortly after the infective bite of tsetse. According to the present authors, the development in human volunteers is quite different, for trypanosomes persist in the primary nodule and "chancre" which invariably develops as a local reaction at the site of the infective bite, whereas the blood is first invaded only some days later. From these observations it was inferred that the trypanosomes developed at the site of the bite and were responsible for the production of the local reaction.

In order to test this hypothesis, the following experiment was carried out. An infected laboratory-bred *Glossina palpalis* was allowed to feed on the arm of a volunteer, and starting from one hour after the bite and in the course of the following 11 days observations were carried out

(by inoculation of blood into rats, by examination of thick blood films, and by puncture of the " chancre ") to detect the time of the appearance of trypanosomes in the general circulation.

The results of these examinations were all negative till the ninth day, when the blood became infective to rats and trypanosomes were found in the fluid withdrawn from the swelling, while on the tenth day they were present in thick blood films. On that day a portion of the skin, including the local reaction, was excised, and one part of it was used for making dab smears, while another was fixed and sectioned for histological study. An examination of the smears revealed typical long blood forms of *T. rhodesiense*. In the sections it could be seen that the trypanosomes were restricted in their distribution to the upper layer of subcutaneous fatty tissue, where there was evidence of oedema, lymph exudate, with formation of new collagen fibres, and marked cellular infiltration, while the dermis exhibited only a cellular reaction.

The authors conclude that the presence of numerous trypanosomes in a limited area of the skin 10 days after the infective bite by tsetse, and their association with marked histopathological changes at the site of the bite, indicate that the metacyclic forms remained localized there, giving rise to long blood trypanosomes. They further suggest that this development is responsible for the tissue reaction, which may be due to an exotoxin produced by the parasites.

The paper is illustrated by photomicrographs showing the localization and appearance of the trypanosomes in the " chancre ". *C. A. Hoare*

Fairbairn, H. **The Penetration of *Trypanosoma rhodesiense* through the Peritrophic Membrane of *Glossina palpalis*.** *Ann. Trop. Med. & Parasit.* 1958, Mar., v. 52, No. 1, 18–19, 7 figs. on 2 pls.

As is known, in the course of their development in the insect, tsetse-borne trypanosomes migrating from the ectoperitrophic space of the midgut to the " anterior station " (proboscis or salivary glands, or both) must pass through the peritrophic membrane. As this is too tough to be penetrated throughout most of its length, the trypanosomes can effect an entrance into the oesophagus only at the points where the membrane is still soft. Previous workers [this *Bulletin*, 1933, v. 30, 794] have shown that this takes place in the region of the proventriculus where the membrane is secreted and is still fluid. In the present work, based on serial sections of the proventriculus of a fly (*Glossina palpalis*) infected with *Trypanosoma rhodesiense*, the author has demonstrated that the trypanosomes can find their way through the membrane even at a point of the proventriculus lining the midgut, where the peritrophic membrane is apparently still soft.

The structures in question and penetration of the membrane are illustrated in a series of photomicrographs. *C. A. Hoare*

Collomb, H. & Salles, P. Du rôle possible des facteurs humoraux (cryoglobulines) dans la pathogénie de certaines manifestations nerveuses de la trypanosomiase humaine africaine, des atteintes périphériques en particulier. [**Possible Role of Humoral Factors (Cryoglobulins) in the Pathogenesis of Some Nervous Manifestations of Trypanosomiasis, especially Peripheral Lesions**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 177–80.

After brief consideration of the explanations put forward for the polyneuritic manifestations of African trypanosomiasis, and an account of such a case seen by them, the authors advance another possible explanation of their origin. Abnormal plasma protein content is common to several diseases. Cryoglobulins are constantly found in trypanosomiasis, and in other diseases such as the myelomatoses, Waldenstrom's macroglobulinaemia, and kala azar. Cryoglobulins precipitate at low temperatures and they may also do so *in vivo* under some circumstances. Possibly a reaction of the vascular wall causes this precipitation. Thromboses and haemorrhages, particularly involving the retina, which cause various muscular pains and cramps, acroparaesthesia such as occurs in Raynaud's disease, and various haemorrhagic lesions of the skin or the brain, are commonly associated with cryoglobulinaemia. Similar lesions of the same origin, resulting in ischaemia, may be the explanation of the polyneuritis—or, better stated, multiple mononeuritis—often seen in cases of trypanosomiasis. *A. R. D. Adams*

Lippi, M. & Sebastiani, A. Variazioni della potassiemia e sodiemia nella tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Variations in Blood Potassium and Sodium in Experimental** *Trypanosoma brucei* **Infection in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Apr., v. 39, No. 4, 209–14. English summary (8 lines).

Lippi, M. & Benedetto, A. Le modificazioni della procainoesterasi e della aspirinoesterasi nella tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Modification of Procaine and Aspirin Esterases in Experimental** *Trypanosoma brucei* **Infection in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Apr., v. 39, No. 4, 223–30. [21 refs.] English summary (7 lines).

Lippi, M. & Sebastiani, A. Variazioni della colesterolemia e delle lipoproteine sieriche nella tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Variations in the Blood Cholesterol and Lipoproteins in Experimental** *Trypanosoma brucei* **Infection in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, May, v. 39, No. 5, 327–35. English summary.

Lippi, M. & Benedetto, A. Variazioni del protido e glicido-gramma nel corso della tripanosomiasi sperimentale della cavia da *Trypanosoma brucei*. [**Variations in Proteins and Glycoproteins in the Serum in Experimental *Trypanosoma brucei* Infection in Guineapigs**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Apr., v. 39, No. 4, 253–63. [16 refs.] English summary.

Chandler, A. C. **Some Considerations relative to the Nature of Immunity in *Trypanosoma lewisi* Infections.** *J. Parasitology.* 1958, Apr., v. 44, No. 2, 129–35. [25 refs.]

From a critical analysis of previous works and on the basis of investigations carried out in his own laboratory, the author arrives at the following conception of the mechanism of immunity in infections with the rat-trypanosome, *Trypanosoma lewisi*. On about the fifth day of infection, antigenic products of metabolism (his "ablastinogens"), representing enzymes required for their nutrition, are released by the trypanosomes and stimulate the formation of an antibody (Taliaferro's ablastin [this *Bulletin*; 1933, v. 30, 122]), which in a few days neutralizes the metabolic products, thereby suppressing the growth and reproduction of the parasites. A day or two later, as the quantity of ablastin increases, a viscous antigen-antibody complex is produced, which causes agglutination of the trypanosomes, without destroying their motility or otherwise injuring them. The agglutinated parasites are mechanically carried to the liver and other organs, where they are subjected to phagocytosis, resulting in a diminution of their numbers (first number crisis) to a level when contact between them is reduced, so that agglutination and destruction by phagocytosis are decreased. The remaining trypanosomes are eliminated either by phagocytosis or by a trypanocidal antibody stimulated by the destruction of numerous parasites during the crisis, or by a combination of both factors.

[For the arguments supporting this interpretation of immunity in *T. lewisi* infections, and for the discussion of the nature of ablastinogen and ablastin, the reader is referred to the original.] *C. A. Hoare*

Lucena, D. T. & Dantas, M. 1.° caso agudo de doenca de Chagas na Paraiba. [**First Acute Case of Chagas's Disease in Paraiba, Brazil**] *Rev. Brasileira Med.* Rio de Janeiro. 1957, Dec., v. 14, No. 12, 855–7, 1 fig.

The English summary appended to the paper is as follows:—

"The first acute case of Chagas' disease in the State of Paraiba is described in a girl, 11 years old, in which blood *Trypanosoma cruzi* was

detected by examining thick blood film obtained during a small survey made in the locality Areia in the vicinities of São Sebastião, Teixeira.

"Triatome bugs (*Panstrongylus megistus*) captured in her house were infected in the high percentage of 74·42%, and the blood of a dog of the same house gave a Guerreiro-Machado complement fixation test positive +++."

ARAGÃO, M. B. & DIAS, E. Aspectos climáticos da doença de Chagas. I—Considerações sôbre a distribuição geográfica do *Triatoma infestans*. [**Climatic Aspects of Chagas's Disease. I. Observations on the Geographical Distribution of** *Triatoma infestans*] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1956, Oct., v. 8, No. 4, 633–41, 5 figs. [15 refs.] English summary.

The distribution of *Triatoma infestans* was found to be limited to the area of mesothermal climate and separated from humid coastal areas by mountain ranges. No such separation was found in dry coastal districts. In Brazil, areas of high rainfall, as in the states of Paraná, Santa Catarina and the south of Minas, were free of *T. infestans*.

E. R. Nye

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

See also p. 1369, SMITH & WEISS, **Bone Marrow Studies in the Sudan.**

KUMAR, S., KUMAR, A., AGARWAL, K. L. & MANGALIK, V. S. **A Study of Serum Proteins in Kala-Azar by Filter Paper Electrophoresis.** *J. Indian Med. Ass.* 1958, July 1, v. 31, No. 1, 14–17, 3 figs. [15 refs.]

"Electrophoretic analysis of serum protein was carried out in 25 proved cases of kala-azar.

"The γ-globulin fraction showed a marked increase and the albumin a decrease in kala-azar which was of a greater magnitude when compared with cirrhosis of the liver.

"The different protein fractions do not bear any relationship to the intensity of a positive aldehyde test. However, the A.G. ratio shows a significant decrease in the aldehyde positive group."

Nussenzweig, V., Nussenzweig, Ruth S. & de Alencar, J. E. Leishmaniose visceral canina nos arredores de Fortaleza, Estado do Ceará: inquérito sorológico utilizando a reação de fixação do complemento com antígeno extraído do bacilo de tuberculose. Observações sôbre o diagnóstico e epidemiologia da doença. [**Observations on the Diagnosis and Epidemiology of Canine Visceral Leishmaniasis in the Fortaleza Area, Ceará, Brazil. Serological Survey by Means of the Complement-Fixation Reaction with an Antigen extracted from Tubercle Bacilli**] *Hospital.* Rio de Janeiro. 1957, Aug., v. 52, No. 2, 111–29, 2 figs. [30 refs.] English summary.

The authors used an antigen consisting of an aqueous extract of tubercle bacilli which had been treated with acetone, in a complement-fixation test carried out on the sera of dogs from several areas in the neighbourhood of Fortaleza, Ceará, Brazil. Liver puncture smears and skin biopsies were also examined.

The locality, methods and results are discussed fully and set out in 6 tables. Among 209 sera, 50 were positive. An atypical reaction was seen in 13 and this is attributed partly to the use of saline in dilution of the sera. In some cases a zone phenomenon was seen.

The parasite was found in 25 of 50 dogs: in 6 of them the direct examination was negative at first but further examination, as a result of positive complement-fixation tests, resulted in a finding of the parasite. 30 of the 50 dogs were considered to be clinically normal: in most of the dogs with symptoms the parasite was found and the complement-fixation titres were higher in them. In view of the variation in the parasitism in dogs, direct diagnostic methods have a relative value.

After 6 months, 11 dogs with positive complement-fixation tests and negative skin and liver smears were re-examined: in 4, skin smears were positive, 4 had reduced serological titres and one reaction was negative.

The epidemiology and prophylaxis of leishmaniasis in dogs are discussed. *H. J. O'D. Burke-Gaffney*

Pirame, Y. & Becquet, R. La leishmaniose cutanée au Tchad. [**Cutaneous Leishmaniasis in the Chad Region**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 170–73.

Although few records have been forthcoming, cutaneous leishmaniasis appears to be common in the Chad region. The authors have been able to find 7 cases within a period of 10 weeks. 3 of these occurred in Africans and 4 in Europeans, comprising 15 different lesions. 1 only was situated on the face, 2 (in Africans) in the dorsal region and 12 on the limbs. A solitary ulcer occurred in 4 but in the others the lesions were multiple.

Curettage of the ulcer margins provided diagnostic preparations in every case.

With 1 exception (a patient who returned to France for treatment), all were treated with glucantime. This antimonial was injected intramuscularly daily in a 20 ml. dose, comprising altogether 6 gm. of the active principle. 2 courses of 15 injections were given with an interval of 2 to 3 weeks.

In order to test sensitivity 5 ml. was injected on the first day and 10 ml. on the next.

On the whole the treatment was well tolerated and cicatrization of the ulcer took place about the 20th injection.

One patient was seen 3 months after termination of treatment and pigmentation of the marginal scar observed.

Injection of glucantime is judged to be the method of choice in cutaneous leishmaniasis. *Philip Manson-Bahr*

Kozhevnikov, P. V. [**Classification of Manifestations of Cutaneous Leishmaniasis (Borovsky's Disease) based upon the State of Reactivity of the Patient's Organism**] *Med. Parasit. & Parasitic Dis.* Moscow. 1958, v. 27, No. 4, 387–90. [In Russian.]

The English summary appended to the paper is as follows:—

"The proposed classification is based upon the variable ability of a sick organism to react during the progress of the disease and comprises: 1) primary leishmaniasis; 2) successive leishmaniasis; 3) manifestation of lymphogenic dissemination of Leishmaniae; 4) diffusive infiltrating leishmaniasis; 5) prolonged cutaneous leishmaniasis; 6) tuberculoidal leishmaniasis; 7) infections with Leishmaniae of a different type; 8) reinfection with the same type of Leishmania; 9) late superinfection; 10) hidden forms of leishmaniasis.

"The classification is applicable to both types of cutaneous leishmaniasis, the urban and the rural (or acutely necrotic) one."

Baker, A. C. & Gutiérrez Ballesteros, E. Tratamiento experimental de las úlceras leishmaniásicas por el procedimiento del calor del vapor. (Nota preliminar.) [**Treatment of Leishmanial Ulcer by the Vapor-Heat Process (Preliminary Note)**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1957, Sept., v. 17, No. 3, 115–19, 6 figs. English summary (5 lines).

The vapor-heat process had been successfully employed for the destruction of insect larvae in fruit, without damaging the latter. The authors have applied this method for the treatment of cutaneous ulcers in guineapigs infected with *Leishmania enrietii* and in human beings with ear lesions produced by *L. brasiliensis*. In both cases the treatment resulted in a cure manifested in cicatrization of the ulcers, while in the

guineapigs it was also confirmed by the disappearance of the parasites from the lesions. *C. A. Hoare*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus: rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Guardiola, A. L. & Paretsky, D. **Metabolic Reactivation of Rickettsiae by Diphosphopyridine Nucleotide.** *Science.* 1958, July 18, v. 128, 141–2. [10 refs.]

Addition of p-aminobenzoic acid (PABA) to enzyme extracts of purified suspensions of *Rickettsia burneti* and *R. prowazeki* inhibited the reduction of diphosphopyridine nucleotide (DPN+) when reacted with malate, the inhibition being partially relieved by adding exogenous DPN+ to the system. No inhibition of dehydrogenase activity was observed when 3,5-dimethyl-4-aminobenzoic acid was added instead of PABA. As DPN+ interacts chemically with PABA it is thought that this reaction explains the inhibition of rickettsial growth by PABA and the reactivation of "inactivated" rickettsiae by restoring DPN+ [this *Bulletin*, 1957, v. 54, 940]. Effects similar to those observed with PABA have been obtained with sulphanilamide. "The implications of the data presented, insofar as they offer an additional mode of sulfonamide action, are apparent and emphasize the biological significance of the chemical reactivity of DPN+." *R. S. F. Hennessey*

Hara, H. **Partial Purification of *Rickettsia mooseri* with a Cation Exchange Resin.** *Japanese J. Microbiol.* 1958, Jan., v. 2, No. 1, 69–77, 5 figs. [3 (1 coloured) on pl.]. [17 refs.]

Addition of a cation-exchange resin (Amberlite XE-64, mix 1A) to suspensions of *Rickettsia mooseri* (obtained by differential centrifugation of yolk-sac homogenates), with "sucrose PG solution without sodium ion" as diluent, yielded preparations which contained about 10% of the total nitrogen of the original homogenates. Egg infectivity and acute mouse toxicity titres were respectively about 10% and 25% of those obtained with untreated homogenates, haemolytic activity being reduced to a lesser extent. The purified preparations showed significant specificity in the complement-fixation test. It is considered that this purification method is superior to any yet reported and can be applied to the preparation of diagnostic antigens and vaccines. *R. S. F. Hennessey*

Yamaguchi, T., Hamada, M., Fukuyama, Y. & Yonemoto, H. [**Tsutsugamushi (Trombiculid Mites) of Shodo Island, Kagawa Prefecture**] *Shikoku Acta Med.* 1958, May, v. 12, No. 5, 781–5, 2 text figs. & 11 figs. on pl. [11 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"In January 1958, authors studied tsutsugamushi in Shodo Island, Kagawa Prefecture, and the following 10 species belonging to 3 genera of tsutsugamushi were found on the 30 *Apodemus speciosus*.

"1. *Trombicula* (*Leptotrombidium*) *fuji* Kuwata, Berge et Philip, 1950.

"2. *Trombicula* (*Leptotrombidium*) *kitasatoi* Fukuzumi et Obata, 1950.

"3. *Trombicula* (*Leptotrombidium*) *pallida* Nagayo, Mitamura et Tamiya, 1919.

"4. *Trombicula* (*Leptotrombidium*) *daisen* Kumada et Sasa, 1953.

"5. *Trombicula* (*Leptotrombidium*) *miyajimai* Fukuzumi et Obata, 1950.

"6. *Trombicula* (*Miyatrombicula*) *kochiensis* Sasa, Kawashima et Egashira, 1951.

"7. *Trombicula* (*Neotrombicula*) *japonica* Tanaka, Kaiwa, Teramura et Kagaya, 1930.

"8. *Gahrliepia* (*Gahrliepia*) *saduski* Womersley, 1952.

"9. *Euschöngastia ikaoensis* Sasa, Sawada, Kano, Hayashi et Kumada, 1951.

"10. *Euschöngastia alpina* Sasa et Jameson, 1953."

Dekking, F. & Zanen, H. C. **Q Fever in the Netherlands.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 157–62, 1 fig. [11 refs.]

Complement-fixation tests with *Rickettsia burneti* antigen on about 6,000 sera collected in the Netherlands during the period 1954–56 from persons with atypical pneumonia or pyrexia of unknown origin showed antibody titres indicative of Q fever in 3 patients. All 3 lived in Rotterdam and had atypical pneumonia during the last quarter of 1956. 1 patient had been near sheep on a heath a few weeks before his illness, but tests on 28 sheep sera from the province concerned and on 150 sera from other parts of the Netherlands gave only negative or weakly positive results. Another patient was a butcher, but only 3 out of 193 sera from slaughterhouse workers at Rotterdam showed antibodies ("in a rather low titre"). Insignificant levels of antibody were detected in 13 [?] out of 595 sera from Dutch cattle in the province of North-Holland. The third patient may have been infected in Switzerland, which he had visited 38 days before the onset of illness. The serum of a travelling companion who had not been ill contained Q fever antibodies at a titre of 1 in 32 four months after his return from Switzerland.

In the light of these results it is concluded that Q fever is "rare in man and absent in indigenous cattle in the Netherlands".

R. S. F. Hennessey

JORDANS, G. H. W. Een geval van Q-koorts. [**A Case of Q Fever**] *Nederl. Tijdschr. v. Geneesk.* 1958, Aug. 9, v. 102, No. 32, 1548–9.

The English summary appended to the paper is as follows:—

"Report on a case of Q fever in a man who was probably infected as a result of his work, viz., the cleaning and processing of imported sheep's wool."

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

CHABAUD, M. A. & OVAZZA, M. La fièvre jaune dans la fédération d'Éthiopie et d'Érythrée. Nouvelles données épidémiologiques. [**Yellow Fever in the Federation of Ethiopia and Eritrea. Fresh Epidemiological Data**] *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 1, 7–21, 3 figs. [11 refs.]

Although the Federation of Ethiopia and Eritrea has common frontiers over a distance of 3,000 km. with countries where yellow fever is endemic or enzootic, no confirmed case of that disease has ever been reported in the federated territories. Immunity surveys made between 1941 and 1944 [this *Bulletin*, 1947, v. 44, 72; 1950, v. 47, 229] had, however, revealed the presence of specific antibodies in sera obtained from the inhabitants of Assab, Eritrea and of Daghabur, S.E. of Dire Dawa in the Province of Harrar; at Assab positive sera were found among adults and children alike, but at Daghabur only among adults. Other positive sera recorded in Ethiopia had been found in one adult inhabitant of Madji in the S.W. Province of Kaffa and in certain inhabitants of the Uabi-Chebeli Valley and of Wallega and Illubador Provinces lying to the north of Kaffa and bordering on the Sudan. In the circumstances it was considered desirable to ascertain the existing yellow fever situation in territories which, without natural barriers to the introduction of the virus, possessed a fauna and topography and, for several months of the year, climatic conditions eminently suitable for dissemination of the virus in much of the federation. To this end an epidemiological survey, which included serological examination of a number of the inhabitants of 8 Provinces and search for possible insect vectors of the virus, was carried

out between March 1953 and March 1955. Results of the survey are presented in the present paper.

Of 509 sera collected from unvaccinated persons and subjected to Theiler's intracerebral test in mice, 7 were positive, 9 doubtful and 493 negative. All 7 positive sera were from inhabitants of Assab, Eritrea, where 64 blood samples were obtained; 3 of the 7 positives were from 24 adults and 4 from 40 children under 15 years of age (2 from the 10–14 years age-group, 1 from the 5–9 years age-group and 1 from the 2–4 years age-group). The child in the 2–4 years age-group must have become immune between 1951 and the beginning of 1954—the period during which, therefore, the last contact of the population of Assab with yellow fever occurred. Of the 9 doubtful sera, all from adults, 6 derived from Eritrea (3 from Massawa and 3 from Assab) and 3 from areas situated at 1,000–1,700 m. Whether the partial protection of the mice under test resulted from neutralization of the virus by yellow fever antibodies or by other antibodies of immunologically related viruses remained undetermined. As regards the 493 negative sera, these derived not only from persons living in regions situated above 2,000 m., such as the Shoa plateau, but also from those inhabiting areas of lower and even of low altitudes. The foregoing results indicate that yellow fever is not endemic in the 7 Ethiopian provinces surveyed, but is endemic in the Assab region of Eritrea. It should be noted, however, that certain of the Ethiopian provinces, *e.g.*, Wallega, as well as much of Eritrea, were not included in the survey.

Results of their entomological research have enabled the authors to furnish a list of those species of mosquitoes which are to be found in the Federation and which, elsewhere, have been shown capable of transmitting the virus under experimental conditions, *viz.*: *Aëdes aegypti*, *A. africanus*, *A. metallicus*, *A. simpsoni*, *A. vittatus*, *A. luteocephalus* (?), *Taeniorhynchus africanus* and *Eretmapodites chrysogaster*. To the list are added the following species, of which the ability, if any, to transmit the virus has not been established: *Aëdes contiguus*, *Taeniorhynchus uniformis*, *Culex fatigans* and *C. poicilipes*. Observations showed, *inter alia*, that, with the exception of a few specimens caught in human habitations at Akobo in western Kaffa (altitude 540 m.) and at Gorgora, to the south of Gonda in Begemeder Province (altitude 1,700 m.), *Stegomyia*, including *Aëdes aegypti*, was generally exophile; that even in Assab, where in 1951–52 the *Aëdes aegypti* index was 1 per 4 rooms, *Stegomyia* was seldom encountered in the houses during the 1954 survey; and that Culicidae, possible vectors of yellow fever, were to be found in most of the surveyed regions below 2,000 m.

In conclusion the authors stress the need for further surveys—these to be carried out in areas of the Federation not covered by the present report. *G. Stuart*

RABIES

GOLDWASSER, R. A. & KISSLING, R. E. **Fluorescent Antibody Staining of Street and Fixed Rabies Virus Antigens.** *Proc. Soc. Exper. Biol. & Med.* 1958, June, v. 98, No. 2, 219–23, 4 figs.

Impression smears of brain were fixed in acetone held first in a dry-ice-alcohol bath, then at −20°C. for 18–24 hours; they were then dried in the cold. These preparations were stained with fluorescent antibody by either the direct method, or by the indirect method with a fluorescein conjugate directed against the antiserum globulins [*Bull. Hyg.*, 1958, v. 33, 807]. Fluorescent bodies were found, ranging in size from that of nerve-cell nuclei to the barely visible, in material infected with street virus. The specificity of the staining was proved by showing that (a) brains of normal mice or of mice infected with other encephalitic viruses failed to show staining; (b) human sera before immunization against duck-embryo vaccine failed to stain while sera from the same persons after immunization stained; and (c) mixing immune sera with suspensions of mouse brain infected with rabies virus completely inhibited their staining power while mixing with normal mouse-brain did not.

There was difficulty in staining preparations stained with fluorescent antibody by means of standard staining methods, but general correspondence between the larger bodies and Negri bodies was established. An inner structure of fluorescent granules was seen only exceptionally. Material infected with fixed virus showed none of the larger bodies but many of the small particles seen with street virus; there were also ring forms with fixed virus. Street and fixed virus preparations could be distinguished only by the presence of the larger bodies which apparently correspond to Negri bodies.

Preliminary trials suggest that the method can be applied to staining antigen in infected salivary glands. *C. E. Gordon Smith*

KISSLING, R. E. **Growth of Rabies Virus in Non-Nervous Tissue Culture.** *Proc. Soc. Exper. Biol. & Med.* 1958, June, v. 98, No. 2, 223–5.

Hamster kidney cell cultures were infected with the CVS strain of fixed virus and sampled for 91 days: no cytopathic changes were observed and virus titres in the fluid varied from $10^{-0.6}$ to $10^{-5.3}$. Subinoculation and serial passage were achieved after it had been discovered that maximum titres were not obtained until the 10th–15th day; a minimum titre of $10^{-1.5}$ was necessary for subculture. Better titres were obtained with higher serum concentrations in the medium, presumably because of protection of the slowly released virus from thermal inactivation. Street virus from dog salivary gland was also successfully propagated in series. In each case the identity of the virus was checked by neutralization test after passage and Negri bodies were demonstrated with the street virus. *C. E. Gordon Smith*

Placidi, L. & Santucci, J. La rage des espèces sauvages et notament des chiroptères. [**Rabies in Wildlife, particularly in Cheiroptera**] *Maroc Méd.* 1958, June, v. 37, No. 397, 682–6. [41 refs.]

Many species of wildlife are at present giving trouble in the control of rabies in affected territories: the wolf in Central Europe, Russia, Iran and India, the fox in Germany and North America, the jackal in North Africa and the Middle East [the skunk in the United States and the mongoose in Puerto Rico and the Union of South Africa]. It is, however, with rabies in bats that this paper is mainly concerned.

The role of haematophagous (vampire) bats in the spread of rabies among cattle in Latin America was first suspected in 1911, but it was not until much later, between 1931 and 1936, following extensive epizootics among cattle and horses in Central and South America and a serious outbreak among the human population of Trinidad, that the definite demonstration of rabies transmission by these vectors was accomplished. That fruit- and insect-eating, non-haematophagous, species could also become infected with rabies was first recorded in Trinidad by Pawan [this *Bulletin*, 1949, v. 46, 254], and since then, following the diagnosis of rabies in one of the common insectivorous bats in Florida in 1953, the virus has been isolated from insectivorous species in many parts of North America and in Yugoslavia. Transmission of rabies by non-haematophagous bats is, then, a possibility, but so far the species involved in such transmission are strictly haematophagous. Vampire bats are not only vectors of rabies but also virus carriers, which can harbour the virus for as long as 4 months; they contract the disease and either die of it or are destroyed, functioning as vectors for only short periods. In infected regions their dead bodies are eaten by such animals as raccoons which, living in caves frequented by these bats, thus become infected *via* the alimentary tract and later communicate the infection to other animals, particularly the dog. Transmission of the virus from vampire bats to one another and to fruit- and insect-eating species is due to the fact that large numbers of bats live together in caves, where, once introduced, infection may readily spread among these animals in their frequent fights with each other. With regard to the infection of insectivorous bats in Yugoslavia, where haematophagous bats are not found, research by Nicolitsch (*Bull. Office Internat. des Epizootics*, 1957, v. 47, 506) has pointed to infection being derived from such insects of their dietary as sexton (burying) beetles, which had become contaminated during their larval stage, spent underground within the dead body of some small animal, *e.g.*, the rat, dead of rabies. The larvae ingest the virus along with the nourishment they derive from the tissues of their dead host and can preserve the virus in a state of latency for 3 months; on the emergence of the adult beetle the virus passes from the latent to the active stage and when the adult is eaten by an insectivorous bat, infection is conveyed to the latter *via* the alimentary tract.

As regards the behaviour and evolution of the virus in Cheiroptera, laboratory investigations have shown, *inter alia*, that in vampire bats experimentally infected the incubation period is 11–17 days, with death from paralytic rabies in from a few hours to 3 days; that in various species of insectivorous bats infected by the ordinary routes with different strains of virus, the incubation period may vary from 25 to 50 days and that virus may be recovered from the saliva and Negri bodies demonstrated in the brain; and that, although vampire bats can transmit the infection for 4 months, it appears that sometimes the virus disappears from the organism by self-sterilization in 6–7 months, as proved by transmission experiments or examination of bats dead at this time.

Finally the strains of rabies virus encountered in nature as street virus are considered. Although these differ considerably from each other in such characters as degree of virulence, length of incubation, and antigenic strength, they, nevertheless, together form a complete antigenic community, whatever their origin, from the highly virulent viruses to some of the African strains, with their so greatly attenuated invasive power.

[Insectivorous bats biting human beings have been reported from Germany and India, but evidence that the bats were rabid has not been forthcoming.] *G. Stuart*

Trubina, L. M. **Serological Diagnosis of Rabies.** *Problems of Virology.* London. 1957, v. 2, Nos. 3/4, 168–71. [Translated from Russian.]

In an investigation of the applicability of the complement-fixation test for the serological diagnosis of rabies, satisfactory fixation was obtained with hyperimmune sheep, rabbit and guineapig sera, and antigens prepared from infected rabbit, rat and mouse brains by ether extraction or repeated freezing and thawing. Active ether-extracted antigens without anticomplementary activity could be obtained more readily from brains which had been stored in 50% glycerol. Fixation was also obtained with 8 of 39 oral washings from rats which contained virus in titres up to 10^2, but attempts to detect rabies antigen in extracts of salivary glands were unsuccessful. *D. J. Bauer*

Placidi, L. & Haag, J. Sur le diagnostic rapide de la rage du chien et le traitement des personnes mordues. [**On the Rapid Diagnosis of Rabies in the Dog and the Treatment of Bitten Persons**] *Maroc Méd.* 1958, June, v. 37, No. 397, 671–81. [Numerous refs.]

After having briefly indicated the generally accepted principles which govern the post-exposure treatment of man, the authors discuss the various methods employed for the diagnosis of rabies in the dog, emphasize the need for rapidity and accuracy in making such diagnosis, refer to the many difficulties which complicate diagnosis both clinical and laboratory, and comment on the latest modifications in the treatment of bitten persons.

If a person has been bitten, diagnosis is urgent, since the course to be followed depends upon it, and the results of the biological test cannot be awaited. Rapid and accurate diagnosis, however, presents certain difficulties. In the living animal clinical signs may be simulated by a number of conditions: Aujeski's pseudo-rabies (mad itch), Carré's disease, epilepsy, cysticercosis, arsenic, lead and mercury poisoning, ear affections, trauma and lesions of the central nervous system. Moreover clinical diagnosis may be complicated by concurrent infections such as piroplasmosis, toxoplasmosis and pneumonia. As, therefore, absolute reliance cannot be placed on clinical manifestations, recourse must be made to histological examination of the autopsied animal's central nervous system for Negri bodies, the specific lesions of street virus rabies. A positive microscopic diagnosis is sufficient proof of the presence of rabies. When, however, microscopical examination proves Negri-negative or questionable, brain substance from the suspected animal is inoculated intracerebrally into white mice, which are then observed for 21 days. For rapid diagnosis 1 or 2 of the mice are sacrificed each day, beginning on the 4th or 5th post-inoculation day, when paralytic signs suggestive of rabies infection first manifest themselves. If Negri bodies are demonstrated in the brains of the mice so sacrificed, the desired diagnosis is obtained. On the other hand, as clinical signs of illness cannot be considered characteristic of rabies—signs of paralysis being often observed in other viral, bacterial and protozoal infections involving the central nervous system of the mouse—a serum-virus neutralization test is then required to provide definite evidence of the identity of the virus. In such circumstances accurate diagnosis is of necessity time-consuming. An aid to rapid diagnosis may, however, be found in the complement-fixation test which, requiring only 5–6 hours for its completion, is recommended by the authors as a routine procedure and as of particular value when Negri bodies are not demonstrable. Results obtained from this serological test by different workers cited in the text show close correspondence with those obtained from histological examinations and biological tests. Other diagnostic methods referred to, but not discussed, are electrophoresis and haemagglutination.

In the section of the paper devoted to diagnosis the authors also deal with such subjects of interest to rabiologists as asymptomatic rabies, rabies infection *via* the alimentary tract and intact mucosa, propagation of the virus otherwise than along peripheral nerves, the possible role of insects in virus transmission, plurality and diversity of strains of rabies virus—reflected in degree of virulence, intensity and type of histological lesions and antigenic potency—latency of the virus and abnormal modes of evolution of the disease.

In the remaining section the efficacy of anti-rabies serum is considered. Tests for the prevention or treatment of rabies by the sera of immunized animals had been carried out since 1888, but were in the main discouraging. In 1951, however, the value of serum therapy was

demonstrated when Koprowski and Cox [this *Bulletin*, 1952, v. 49, 615], using concentrated hyperimmune serum, found it possible, under experimental conditions, to protect animals against rabies, even after infection, by a single injection of serum containing sufficient antibodies to destroy and neutralize the virus before it penetrated into the nervous system. This finding encouraged the hope that, in the case of severely exposed human beings, the use of hyperimmune serum, as an adjunct to vaccine treatment, might reduce the mortality figures frequently consequent on vaccination alone. That this hope was not unfounded was proved in 1954, when in Iran the protective value of combined serum-vaccine prophylaxis was established beyond doubt in the case of persons gravely bitten on the head and face by a rabid wolf. [See *ibid.*, 1956, v. 53, 434].

[As regards diagnosis, the WHO Expert Committee on Rabies in its third report (*World Health Organization Technical Report Ser. No. 121*, 1957, p. 23; this *Bulletin*, 1957, v. 54, 809) expressed the view that "there is as yet insufficient evidence for the validity or superiority of proposed diagnostic methods, such as complement-fixation and paper electrophoresis, and therefore they cannot be considered as substitutes for the established histopathological and biological methods currently in use".] *G. Stuart*

Piskareva, N. A. **The Technique of testing Antigenicity of Rabies Vaccines.** *Problems of Virology*. London. 1957, v. 2, Nos. 3/4, 178–83. [Translated from Russian.]

In 500 mice vaccinated on successive days with 6 interperitoneal injections of rabies vaccine of Phillips type prepared from the Leningrad and Moscow strains of fixed rabies virus, the protection index determined by intracerebral challenge rose to 1778 and 1318 on the 22nd day after the beginning of vaccination, and then declined abruptly to reach 40 on the 42nd day. During the process of immunization up to 31% of the mice died from rabies. Neutralizing antibody appeared on the 5th day and attained a maximum titre of 5×10^5 on the 22nd day. A high neutralization index was also obtained in mice which had been immunized with vaccine inactivated by heating at 37°C. for 62 hours, and an adequate protection index was obtained by immunizing mice with inactivated vaccine, followed by vaccines of successively higher infectivity titres. *D. J. Bauer*

Wang, San-Pin & Lin, Chau-Ching. **Preparation of Antirabies-Serum.** *J. Formosan Med. Ass.* 1957, Oct., v. 56, Nos. 9/10, 426–34, 1 fig. [11 refs.]

The authors have prepared rabies antiserum from Chinese ponies, which were immunized with three or four courses of injections of rabbit

or goat brain antigens with intervals between courses of 2 weeks. Bleeding was carried out 3–4 weeks after the final injection. The potency of the antisera was determined in neutralization tests, and was of the same order as that of a commercial antiserum tested in parallel. The antiserum was purified and concentrated by pepsin digestion and fractional precipitation with ammonium sulphate. The potency was increased by 6·3 times, with a reduction in volume to 1/14, giving an overall loss of antibody of 55·3%. *D. J. Bauer*

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Eisler, D. M., Kubik, G. & Preston, H. **Colonial Morphology and Virulence of** *Pasteurella pestis*. *J. Bacteriology*. 1958, July, v. 76, No. 1, 41–7, 2 figs. [22 refs.]

Relation of colonial morphology of *Pasteurella pestis* to virulence is controversial. Some relate virulence to roughness, some to smoothness. Rough and smooth virulent and avirulent colonial types have been found in many strains.

The authors found that hereditary transmission of colonial characteristics was not so unstable as had been thought. They found that both smooth and non-smooth variants are entities capable of survival during mouse passage. Both smooth and non-smooth may be virulent or avirulent. There were biochemical differences between the two forms as shown by sugar fermentation but they were variable from strain to strain. *P. pestis* cannot be assumed to be homogeneous in colonial morphology. Smooth and non-smooth forms may co-exist in the natural state; they were isolated direct from a plague bubo. Smooth forms bred true but non-smooth varied. Some strains of non-smooth gave rise to pure non-smooth while selected non-smooth varieties of others were characterized by a high rate of dissociation to smooth.

It is suggested that no virulent parent stock is entirely confined to smooth constituents. Virulent parent strains may contain virulent or avirulent smooth forms but generally possess virulent non-smooth components. No avirulent parent stock is entirely composed of non-smooth elements. Many avirulent strains are completely smooth. No stock strain, virulent or avirulent, is free from smooth forms. Persistence of virulence is greater in non-smooth forms though this form may be in the minority in the parent stock.

It appears that the world population of *P. pestis* is a complex of smooth and non-smooth forms, both of which may be virulent.

P. A. Clearkin

Kupferberg, L. L. & Higuchi, K. **Role of Calcium Ions in the Stimulation of Growth of Virulent Strains of** *Pasteurella pestis*. *J. Bacteriology*. 1958, July, v. 76, No. 1, 120–21.

The presence of calcium in a medium is an important factor for the growth of virulent strains of *Pasteurella pestis* at 37°C. This requirement is not observed at 27°C. As 37°C. is the approximate temperature at which growth occurs *in vivo* a correlation between virulence of *P. pestis* and the requirement of calcium for growth may be significant.

The present experiments showed that virulent strains grew well at 37°C. only in the presence of added calcium. There was no indication that calcium exerted an effect on growth of avirulent strains.

P. A. Clearkin

Burrows, T. W. & Bacon, G. A. **The Effects of Loss of Different Virulence Determinants on the Virulence and Immunogenicity of Strains of** *Pasteurella pestis*. *Brit. J. Exper. Path.* 1958, June, v. 39, No. 3, 278–91. [23 refs.]

"A comparative study was made of the virulence and immunogenicity of genetically related strains of *Pasteurella pestis* having all permutations of the virulence determinants F1+, VW+ and P+. Two corresponding series of strains were selected, one of which was dependent (Pu−) and the other independent (Pu+) on an exogenous supply of purines for growth. Virulence studies supported previous conclusions. The studies on immunity to experimental plague revealed a complex interaction of factors which prevents a brief summary being made; many statements would require qualification as to the animal species, the method of immunization and the nature of the challenge employed. Mice, guinea-pigs and rabbits differed in their antibody response to living vaccines and, in one or other of these species, the antigenic response to one determinant appeared to be modified by the presence of a second determinant in the vaccine.

"Mice were best protected against F1+ virulent challenge by F1+ VW+P+ vaccines; F1+VW+ vaccines were greatly superior to F1+VW− vaccines, while F1−VW− vaccines whether P+ or P− were non-protective. In guinea-pigs F1+ vaccines were more highly protective than F1−, and P− more protective than P+. In this species the determinant VW+ detracted from the active immunising ability of vaccines. Comparison of the immunogenicity of Pu+ and Pu− vaccines in guinea-pigs indicated that the former produce a protective antigen *in vivo*. F1 and W antigens gave detectable humoral antibody in all three species, whereas V antigen gave good response in rabbits, very poor response in mice and appeared to be non-antigenic in guinea-pigs."

GIRARD, G. Données numériques sur la densité microbienne d'une rate de souris morte de peste septicémique. [**Numerical Data on the Density of Micro-Organisms in the Spleen of a Mouse dead from Septicaemic Plague**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 146–9.

The author endeavoured to ascertain the number of viable micro-organisms in the spleen of a mouse dead of septicaemic plague. He is aware that only an approximation can be achieved on account of individual variations and other factors.

The spleen was removed with aseptic precautions and emulsified in normal saline, decimal dilutions were made of the suspension and cultured on tubes of peptone (not nutrient) agar. After 3 days' incubation at 26 to 30°C. the colonies were counted and the number of organisms in the original emulsion estimated.

From a series of experiments lasting over several years the number present in the spleen was calculated to lie between 5 and 25 thousand million. *P. A. Clearkin*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

BHASKARAN, K. **Genetic Recombination in** *Vibrio cholerae*. *J. General Microbiol.* 1958, Aug., v. 19, No. 1, 71–5. [10 refs.]

In a search for genetic recombination in *Vibrio cholerae* various pairs of strains were incubated together and inoculated onto media which would not support the growth of either parent strain alone. Of 26 such crosses one gave results of interest, some hundreds of colonies growing from an inoculum of about 10^9 cells of the mixture; these colonies had the " smooth " character, streptomycin-resistance and purine-independence of one parent (strain 121), and the methionine-independence of the other (strain 129). Strain 129 was lysogenic, liberating a phage (phage 129) active on strain 121. Other pairs of strains which had failed to recombine did so when one strain of a pair was made lysogenic with phage 129. The data are consistent with the view that the observed recombination of heritable characters results from the transduction of genes by phage particles released by cells of the lysogenic strain; but high-titre phage lysates could not be obtained, so that no rigorous test of the hypothesis of phage-mediated transduction in *V. cholerae* could be made.

B. A. D. Stocker

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Freedman, L., Maddison, S. E. & Elsdon-Dew, R. **Monoxenic Cultures of *Entamoeba histolytica* derived from Human Liver Abscesses.** *South African J. Med. Sci.* 1958, Apr., v. 23, No. 1, 9–12. [10 refs.]

The present paper describes a series of experiments for the preparation of monoxenic cultures of *Entamoeba histolytica* from human liver abscesses. In the first experiment the pus from 24 cases of liver abscesses was cultured and amoebae were successfully grown in one-quarter of that number. Locke-egg slopes were used, with an overlay of Locke solution and the addition of rice powder, in the presence of *Clostridium welchii*, which alone proved successful in primary isolation. Other bacteria could be used if the medium was preconditioned for 48 hours. When the pus was very thick it was broken down enzymatically by means of streptodornase, followed by concentration of amoebae through centrifugation. The authors suggest that cultures should be kept for 10 days before being discarded as negative. In the next experiment isolation of amoebae was successful with 7 out of 8 samples of pus.

In order to grow *E. histolytica* with other bacterial associates three methods were used, including, first, the Shaffer-Frye technique [this *Bulletin*, 1948, v. 45, 786], with slight modifications. Second, the original culture of *E. histolytica* with *Cl. welchii* was cultured into the tissue-bearing medium of Shaffer *et al.* [*ibid.*, 1954, v. 51, 267] and *Cl. welchii* destroyed by penicillin. Growth with a number of different bacteria was obtained. Finally, the transfer was made from the same combination to the *T. cruzi* medium of Phillips [*ibid.*, 1950, v. 47, 624, 741] when *Cl. welchii* was again killed by penicillin. When it is desirable to switch *E. histolytica* to a third bacterial associate, the bacterial population is reduced by washing and centrifugation and high doses of one or more antibiotics then added to complete the removal of bacteria; these antibiotics are themselves removed in turn by washing.

J. D. Fulton

Lamy, L. & Molinari, V. Diversité et interprétation des réponses des différents complexes [Amibes-Flore bactérienne] à l'action de substances antibiotiques. [**Variation in Amoebic-Bacterial Associates and Interpretation of Responses to Antibiotics**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 209–17. [14 refs.]

The bacterial flora which accompanies *E. histolytica in vitro* or *in vivo* may exercise considerable influence on the result of treatment by drugs.

The authors have stressed this fact in an earlier paper on the same subject [this *Bulletin*, 1958, v. 55, 1012]. The effect of 12 well-established antibiotics on the bacterial flora accompanying 6 different cultures of *E. histolytica* aged from 4 months to 12 years and also their effect on amoebic growth have been studied. The results are shown in a table. It was evident to the authors that some of the antibiotics had little action on the bacterial flora and when this was the case the drugs were also ineffective against the accompanying amoebae. By choosing a culture with bacterial flora very sensitive to chloramphenicol and another with flora insensitive to the same drug, it was proved by changing the bacterial flora or by mixing them that the antiamoebic activity depended on antibacterial activity. In other words, the action on amoebae was secondary to that on bacteria. This, according to the authors, explains the variations in results obtained by different authors with the same drug, for the accompanying flora may show wide variations. For the same reason, the practice of keeping amoebic cultures constantly in contact with an antibiotic is deplored. The presence of amoebae plus bacteria is responsible for the pathogenic syndrome. It is suggested that the classical amoebicides should not be discarded in favour of antibiotics which tend to alter completely the balance of the gut flora.

J. D. Fulton

Pelikán, V. & Trapl, S. Jaterní amébiasa a její léčení. [**Amoebiasis of the Liver and its Therapy**] *Časopis Lékařů Českých*. Prague. 1958, Aug. 29, v. 97, No. 35, 1099–1102. [22 refs.] English summary.

An account of 22 cases seen in Korea in 1956.

Barker, E. M. **Colonic Perforations in Amoebiasis.** *South African Med. J.* 1958, June 21, v. 32, No. 25, 634–8. [15 refs.]

Perforation of the colon in amoebic dysentery is a rare but serious complication and it accounts for a significant proportion of deaths from this disease. At the King Edward VIII Hospital, Durban, S. Africa, 2,000 to 3,000 patients are admitted annually for amoebic dysentery and 20 to 30 of them have colonic perforations. When these occur in the fulminating type of amoebic dysentery there is a true generalized peritonitis even before macroscopic perforation occurs. Toxaemia, with dehydration and electrolyte imbalance, and paralytic ileus are concurrent in these cases; the only positive signs of perforation in these gravely ill patients are the presence of free fluid in the peritoneum and X-ray evidence of free intraperitoneal gas seen by a lateral radiograph taken in the supine position. In these cases any form of surgical intervention is both useless and dangerous, but some gratifying recoveries follow control

of the dehydration and electrolyte imbalance, of the blood volume, and of the infections by emetine injections together with intravenously administered oxytetracycline. Promptitude and great care and attention to detail is necessary in all these matters.

Other forms of perforation in less severe forms of amoebic dysentery, such as an amoeboma going on to perforation, or a localized pericolic abscess which ruptures, may be treated surgically like other forms of intestinal perforation if occasion demands; but interference must not be precipitate and every chance must first be afforded to emetine and the antibiotics to control infections with the causative parasites and their associated secondary bacterial invaders.

There are details of some illustrative cases and an analysis of 1,000 cases selected at random—of the latter, 19 patients had perforations and 14 of them died. *A. R. D. Adams*

Amaral, A. D. F. & Pires, C. D. de A. Observações sôbre novo amebicida de largo espectro. (Nota preliminar.) [**Observations on a New Broad-Spectrum Amoebicide**] *Hospital.* Rio de Janeiro. 1958, July, v. 54, No. 1, 75–82. English summary.

Glorieux and also Van Droogenbroeck [this *Bulletin*, 1957, v. 54, 1082, 1083] used a phenanthroline derivative, 11.925 (Ciba Laboratories) in the treatment of amoebiasis.

The present authors, from São Paulo, Brazil, have made a preliminary study of a similar preparation, 11.925C, in 8 carriers of *E. histolytica* and other intestinal parasites and compared the results with those in 6 patients similarly infected but untreated. Stools were examined by various concentration methods and by stained preparations. The dose used was 100 mgm. three times daily for 7 days.

All the patients had one or more other protozoal and helminthic parasites which included *Endolimax nana*, *Iodamoeba bütschlii* and *Giardia intestinalis*.

The results are shown in tables, from which it appears that the amoebae disappeared in all the treated patients; but *Giardia* was unaffected. In the untreated patients, the parasites present were practically the same over a similar period. There were no symptoms of intolerance to the drug.

The treated patients were prisoners and all were "of the oligosymptomatic group": furthermore, the negative results reported were obtained in stool examinations made between 4 and 11 days after treatment. While the authors rightly point out that these examinations should be repeated at longer intervals to ascertain if the results are confirmed, they consider that these preliminary studies suggest that 11.925 C has an amoebicidal action not only on *E. histolytica* but also on all other intestinal amoebae.

[In a personal communication, the authors have pointed out that the original paper contained several typographical errors. They have sent a revised edition, on which this abstract is based.]

H. J. O'D. Burke-Gaffney

Balsam, T. & Shaffer, J. G. **The Effect of Viable Bacteria on the Capacity of a Strain of Large-Race *Entamoeba histolytica* to produce Abscesses in the Hamster Liver.** *Amer. J. Trop. Med. & Hyg.* 1958, Jan., v. 7, No. 1, 17–19.

The object of the investigation described in this paper was to ascertain the role—if any—played by bacteria in the initial production of liver abscesses by *Entamoeba histolytica*. For this purpose, the amoebae were grown for 48 hours in the Shaffer-Frye medium, in which a non-multiplying Gram-negative anaerobic streptobacillus had been previously cultivated for 24 hours in the presence of penicillin. After repeated centrifugation, suspensions of the amoebae were injected directly into the liver of hamsters. The inocula (with amoebae prepared as described above) were of three types: in one the volume of the suspension was brought up to 2 ml. by addition of supernatant fluid; in another—by addition of a culture of streptobacillus, and in the third—by addition of procaine penicillin (50,000 units per ml.). The dose in each case was 0·1 ml., containing 14,000–30,000 amoebae, and the viability of the bacilli was checked by subcultivation of samples of each inoculum. The experimental hamsters were autopsied a week after inoculation, the livers were inspected for gross lesions, and Shaffer-Frye cultures, made from the lesions, were examined for the presence of amoebae.

The results were as follows: out of 35 animals inoculated with amoebic cultures which were negative for bacteria, hepatic lesions developed in 2 (6%) cases, whereas out of 63 animals inoculated with amoebic cultures containing viable bacteria, liver abscesses developed in 34 (54%) cases. It is concluded that there is some synergistic relationship between the bacteria and amoebae, which enhances the power of the latter to initiate liver abscess, irrespective of the number of bacteria present in the inoculum.

C. A. Hoare

de Carneri, I. Studi su *Entamoeba moshkovskii*. I. Velocità d'azione di 16 farmaci sui trofozoiti di *Entamoeba moshkovskii* Tshalaia, 1941, a 3 diverse temperature. [**Studies on *Entamoeba moshkovskii*. I. Action of 16 Drugs on Trophozoites of *E. moshkovskii* at 3 Different Temperatures**] *Riv. di Parassit.* Rome. 1958, Apr., v. 19, No. 2, 81–9. [15 refs.] English summary.

The author describes the results of amoebicidal tests carried out *in vitro* on a Brazilian strain of the free-living amoeba, *Entamoeba moshkovskii*, grown in Pavlova's medium at temperatures of 4°, 26° and 37°C., with

mixed bacterial floras. The antibiotics and chemotherapeutic compounds were tested in various dilutions upon suspensions of the culture, set up in equal amounts, totalling 4 cc. and containing 200 thousand amoebae. The cultures were examined microscopically at intervals from 30 minutes to 14 days from the beginning of the test. The effect of the drug was assessed by the absence or presence of living amoebae.

The results, which are given in a table, show that *E. moshkovskii* was more sensitive than *E. invadens* and *E. histolytica* to the action of carbarsone, yatren [Chiniofon], chloroquine, bacitracin, erythromycin, tetracycline and trichomycin. At 26°C. the action of pyrimethamine on this amoeba was similar to that on *E. invadens*, but at 37°C. it was more like the effect upon *E. histolytica*. Similar differences were observed in the effect of the two optical isomers of chloramphenicol at these temperatures, whereas dihydrostreptomycin and penicillin proved to be practically inactive. It was found that an increase of temperature had only a slight effect on the speed of action of trichomycin but a much greater one in the case of other compounds, especially fumagillin and emetine. At 4°C. fumagillin and emetine, used in the highest dose, were inactive even after a fortnight.

On the whole, the amoebicidal power of the drugs tested, and the speed at which they acted, depended largely on the temperature at which the treated cultures were incubated. Moreover, their effect upon *E. moshkovskii* at 26°C. and 37°C. was like that upon *E. invadens* and *E. histolytica* respectively. *C. A. Hoare*

Meerovitch, E. **Some Biological Requirements and Host-Parasite Relations of** *Entamoeba invadens*. *Canadian J. Zool.* 1958, Aug., v. 36, No. 4, 513–23, 1 fig. [16 refs.]

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Lanzo, A. Terapia della febbre ricorrente con aureomicina. [**Treatment of Relapsing Fever with Aureomycin**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Apr., v. 39, No. 4, 235–8.

The English summary appended to the paper is as follows:—

"The author has treated 29 cases of relapsing fever with Aureomycin; some of them with serious complications. The results were always dramatic, with two relapses only in the following two months."

See also p. 1305, Taylor, **The Effects of Cod-Liver Oil and Vitamin E on Infections of** *Plasmodium gallinaceum* **and** *Treponema duttoni*.

YAWS AND OTHER TREPONEMATOSES

Mikol, C. & Solente, G. Réaction universelle de Kahn et sérums pianiques. [**Universal Reaction of Kahn and Yaws Sera**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 162–6.

The complex extract of lipids used by Kahn in the serological diagnosis of syphilis under the name of standard antigen, flocculates with non-syphilitic sera if an extended series of saline dilutions is used and incubation on ice is carried out. In the case of syphilis the reaction takes a special course characterized by stability of the flocculation limited to the dilution of sodium chloride between 6–9% and 12%, particularly round 9%. The titre thus attained is not modified by incubation on ice. In false positive reactions the pseudo-syphilitic reaction is characterized by the progressive nature of the flocculation after incubation on ice. Examination of 29 yaws sera led Kahn to believe that the nature of the reaction in treated yaws resembled that of syphilis but that of non-treated yaws was different.

The universal reaction of Kahn differentiates sera from cases of yaws and syphilis, thus differing from the usual serological reactions, from those employing treponemal antigens and even from Nelson's immobilization test. The immunological identity of the sera of the two diseases is generally allied with an antigenic identity of *Treponema pertenuc* and *T. pallidum*. The discordance of the universal reaction in yaws and syphilis would therefore appear interesting to investigate.

The authors studied the universal reaction in 23 sera obtained from old cases of yaws and of 20 sera obtained from suspected old cases of yaws in which, as far as possible, syphilis was excluded, but they were unable to confirm Kahn's report of a specific type of reaction in yaws. On the contrary, 31 of the 43 gave a universal reaction of the pseudo-syphilitic type showing progressive flocculation on ice. *P. A. Clearkin*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Chaussinand, R. & Mendes, P. L. Lepra. Noções sumárias sobre clínica, diagnóstico, epidemiologia e profilaxia. [**Summarized Account of the Clinical, Diagnostic, Epidemiological and Prophylactic Aspects of Leprosy**] *Bol. Serviços de Saúde Pública.* Lisbon. 1957, Oct.–Dec., v. 4, No. 4, 425–75, 21 figs.

A general account, with numerous illustrations.

Mullick, D. K., Sen, S. C. & Sen, P. **The Bankura Rural Leprosy Investigating Centre. An Overall Epidemiological Report for the Period between 1937 and 1956.** *Leprosy in India.* 1957, July, v. 29, No. 3, 87–97.

The work of this investigation centre in West Bengal extends from the year 1936 [this *Bulletin*, 1938, v. 35, 883] to 1956. The population in 1937 was 10,000 with 424 cases of leprosy; in 1956 the population was 10,719 with 526 cases. The number of lepromatous cases has increased during the 20 years from 96 to 105, although 79·3% of the original lepromatous patients had died. Thus, during this period the disease has increased, as has also the proportion of lepromatous cases, and this in spite of the fact that there has been no famine in the last 12 years, but rather the area has been one of surplus from which food was sent to more needy areas. Previous to that there was severe famine and many leprous patients died, to be succeeded after the famine by new cases.

Nothing is said of treatment in this area, but in two new neighbouring areas with populations respectively of 24,000 and 20,000 there is intensive study and treatment. *Ernest Muir*

Kitano, H. [**Epidemiological Studies on Leprosy in Gifu Prefecture. II. Geographical Distribution of Leprosy and the Familial Relationship**] *Lepro.* 1958, Jan., v. 27, No. 1, 62–72, 3 figs. [12 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"A breakdown of the 292 reported cases of leprosy occurring in Gifu prefecture between 1936 and 1955 showed that a greater number were from the rural areas than the cities. There were 11 towns and 27 villages however, in which not a single case was reported during this 20 year period. This is equal to 34% of the total cities, towns and villages.

"Of the total number of cases, 90% occurred in natives of the prefecture while the remaining 10% were Koreans.

"The figures suggest that the percentage of leprosy cases in Koreans is 13·0–8·7 per 100,000.

"The prefecture was arbitrarily divided into 4 districts according to locale and economic status. It was found that there were districts in which the cases were on the decline, where it was yet prevalent, others where the number of cases appeared small due to poor medical facilities and still others where a large number of cases were present in a single family.

"The familial incidence was 23·3% (68 out of 292 cases) and the source of infection was one of the parents in 38·2%, other siblings 32·4% and the grandparent in 10·3%."

OGATA, K. **Energy Metabolism and Temperature Regulation in Leprosy.** *Bull. Res. Inst. Diathetic Med., Kumamoto Univ.* 1957, Mar. 10, v. 7, Suppl., 45 pp., 17 figs. [38 refs.]

The object of this monograph is " to make inquiries into the *milieu interior* of leprosy patients as observed from a physiological standpoint of body temperature regulation ". In examining the mechanism of heat production it was found at the National Leprosarium at Kumamoto that basal metabolism rose by 8% from the average in the winter and fell by 9% in the summer, a difference of 17% in residents there as compared with 10% in average Japanese: the seasonal variation was even greater in leprosy patients. In this respect there was no difference between lepromatous and neural types. In erythema nodosum leprosum there is a marked rise in basal metabolism and a remarkable fall in the respiratory quotient, suggesting difficulties in the intermediate metabolic process.

Next is considered the mechanism of body heat elimination. With the spreading of skin lesions the sweat function is damaged, and there is compensatory increased sweating in the unaffected skin areas, but this hyperfunction is also observed in mild cases where the patient's affected area is so slight that no compensation is necessary. The effect of adrenaline on the sweat function is discussed, and the question is raised as to whether or not the sweat glands of leprosy patients are more adrenergic than those of normal people. The effect of nicotine injection on sweat response is also considered. It was found that some leprosy patients, who had an impediment in sweating and were suffering from heat congestion, were secreting a large amount of saliva, and that proportionate to the increase of saliva there was a decrease in its chlorine content.

In the hot weather the skin temperature of leprosy patients, whatever the type, does not differ from that of healthy people, nor does the temperature of those with the neural type vary from that of the normal person in the cold weather. But in winter in the lepromatous patient the vasomotor regulation does not work until the environmental temperature goes down below 20°C. It was found that when the three functions of the skin—sensation, sweating and vasomotor activity—are lost in leprosy, the last to be lost is vasomotor activity.

The third chapter considers the problems of body temperature regulation. While the regulation of the body temperature is normally controlled chiefly by the skin, in leprosy " it is not reasonable to put the chief responsibility for the temperature regulation upon the thermal sensation of the skin alone ". It is suggested that in lepromatous patients the products of destroyed body tissues may accumulate in the body much more than in neural patients, and that histamine-like substances will increase in the body fluid; it is considered that the function of the body temperature regulation is greatly influenced through changes in chemical constituents of the body fluid. In this connexion the

carbohydrate and protein metabolism of the body in leprosy are studied. The fasting blood sugar level is lower in lepromatous than in neural leprosy, especially in patients with a tendency to erythema nodosum.

Lastly, the author describes an experiment in which a healthy man and a severe neural leprosy patient were placed in a hot environment long enough to become congested with heat. "An intake of 200 cc of ice water produced no effect on the metabolism in the healthy man, while in the patient it resulted in a marked depression." This proves increased sensitivity of the digestive tract in leprosy patients, and "presumably of the internal organs in general". *Ernest Muir*

IMAEDA, T. [**Phosphorus Metabolism in the Leprous Lesions. 1. Histochemical Study of Phosphatases in the Cells in Tissue Cultures.**] *Lepro.* 1958, Jan., v. 27, No. 1, 1–13, 8 figs. on 2 pls. [15 refs.] [**2. The Histochemical Study of Phosphatases in the Leprous Lesions.**] *Ibid.*, 14–25, 6 figs. on pl. [12 refs.]

ISHIHARA, S. [**Giant Cells and Inclusion Bodies in the Skin Lesions in Leprosy**] *Lepro.* 1958, Jan., v. 27, No. 1, 26–36, 14 figs. [In Japanese.]

The English summary appended to the paper is as follows:—

"The occurrence of giant cells and the appearance of inclusion bodies in the lesions of the skin were examined in 276 cases of leprosy.

"1) In the tuberculoid type, giant cells were observed in 22 of 28 cases (78·5%) in the flourishing stage whereas in the absorption stage, they could not be found. Giant cells were noted in 22 of 180 cases (12%) of the lepromatous type.

"2) Giant cells were observed in the skin lesions of the reactional stage in 19 of 45 cases of erythema nodosum leprosum, 3 of 4 cases of acute infiltration and 2 cases of acute exacerbation.

"3) Giant cells which were observed included the typical Langhans type, the foreign body giant cell and the Touton type giant cell. It was noted that development was by clumping and division.

"4) Examination of the relationship between appearance of giant cells and clinical symptoms showed that the giant cells appeared in the flourishing stage of the tuberculoid and the declining stage of the lepromatous type.

"5) Inclusion bodies were observed in the giant cells in 9 cases of the lepromatous type and 3 cases of erythema nodosum leprosum but were not observed in the tuberculoid type.

"6) The inclusion bodies were asteroid in all 12 of the cases and Schaumann body could not be detected."

Burrell, R. G. & Rheins, M. S. **Antigenic Analysis of Lepromin by Agar-Diffusion.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 223–30, 1 fig. on pl. & 2 text figs. [10 refs.]

In this investigation, the reagents were allowed to diffuse from disks of filter paper into 0·8% agar in phosphate buffer saline, *p*H 7·4, containing 1M glycine in Petri dishes incubated at 4°C., and the plates were examined for precipitin lines at 3-day intervals.

With lepromin, undiluted and at dilutions of 1 in 15, 1 in 30 and 1 in 60, serum from patients with lepromatous leprosy produced 2 lines of precipitation whereas serum from patients with tuberculoid leprosy produced only 1 line. In identity tests, with these 2 sera and a hyperimmune anti-BCG rabbit serum, a common continuous line of precipitate was produced by all 3 sera, indicating the presence of an antigen in the lepromin which reacted with an antibody common to each sera. An additional non-identical line was produced by both the lepromatous and the anti-BCG serum. With OT as the antigen, a common identity line was produced by the lepromatous and the anti-BCG serum but not with the tuberculoid serum.

Neutralization tests, in which the antigens were incubated with sera before being tested, confirmed the presence of these common antigens.

The sera, from 44 schoolchildren of Cebu in the Philippines, an area of endemic leprosy, and the sera from a similar number of children from Columbus, Ohio, were tested with lepromin and tuberculin; 43 of those from the leprosy area reacted with lepromin and could be neutralized with tuberculin, whereas only 7 from the non-leprosy area gave a similar reaction, but these could not be neutralized with OT. None of these sera reacted to the tuberculin antigen, but the sera of 4 of 35 tuberculous patients from Columbus reacted to tuberculin and 8 reacted to lepromin. The sera from the children in the leprosy area, therefore, reacted with lepromin with a specificity not observed with normal and tuberculous sera from patients not in a leprosy area; in failing to react with tuberculin, these sera resemble sera from tuberculoid leprosy patients.

Sera from 5 members of a hospital staff gave no reactions with lepromin or OT, either before or after BCG vaccination. *S. R. M. Bushby*

Collier, W. A., Bueno de Mesquita, S. J. & van Zanten, E. **Quantitative Cold Complement Fixation by Blood Sera of Leprosy Patients.** *Trop. & Geograph. Med.* Amsterdam. 1958, June, v. 10, No. 2, 171–4.

These authors carried out complement-fixation tests (CFT) on 372 sera from patients suffering from various types of leprosy, contacts, nursing staff, normal persons and tuberculosis patients; the antigen was that used for tuberculosis CFT and parallel tests were carried out at 37°C. and 4°C.

Detailed results are set out in 2 tables from which it can be seen that titres tended to be higher when fixation occurred at 4°C. than at 37°C.;

the only exceptions to this were 28 sera from L-leprosy patients, 14% of which were negative at 4°C. as against none at 37°C.; the greatest differences in titres were in the contacts group (24) where titres of 1/160 were obtained at 4°C. compared with 1/5 at 37°C. Sera from normal persons (50) showed little difference at 4°C. and 37°C. and this suggests that there is a special significance to be attached to the 2 types of CFT, but this needs much more research. *T. E. Osmond*

KANDHARI, K. C. **Leprous Lesion on an Unusual Site.** *Leprosy in India.* 1957, July, v. 29, No. 3, 98, 2 figs. on pl.

A nodular lesion on the glans penis.

SATO, K., KASUGA, T. & ITO, T. [**A Case of Pulmonary Mycosis complicating Leprosy**] *Lepro.* 1958, Jan., v. 27, No. 1, 54–61, 8 figs. [Numerous refs.] [In Japanese.] English summary.

BERGEL, M. Consideraciones sobre quimioterapia de la lepra. [**Observations on the Chemotherapy of Leprosy**] *Leprologia.* Buenos Aires. 1957, July–Dec., v. 2, No. 2, 107–10. English summary.

In describing the histopathological character of leprosy infection the author mentions a deposit of acid-fast pigment in animals suffering from deficiency of vitamin E and on a diet containing pro-oxidants. He mentions that the various drugs which have in the past been found of use in the treatment of leprosy, such as sulphones, thiosemicarbazone, isoniazid, have an anti-oxidant effect and the power to inactivate heavy metals. He also mentions the liposolubility of chaulmoogra oil.

In seeking for new chemotherapeutic agents for leprosy, or improved modifications of existing ones, it is suggested that the above factors should be taken into consideration: drugs found useful in the active medication of tuberculosis or of murine leprosy, drugs found useful in actinomyces or in other mycobacterial diseases, and especially any drugs found of use in more than one of these conditions and at the same time liposoluble. Hanks has shown that a continuous supply of oxygen is necessary to preserve the infectivity of mycobacteria; it is important therefore in the treatment of leprosy to have conditions which restrict the supply of oxygen. There should also be fresh oils and green vegetables in the diet, as these are the sources of tocopherols (vitamin E), and there should even be the separate administration of tocopherols. It is also suggested that a trial should be made of all metallic inactivators of low toxicity, which can be absorbed by the mouth, with good conditions for deposit in and distribution from the fatty tissues.

[See also this *Bulletin*, 1958, v. 55, 527.] *Ernest Muir*

Pardo Castelló, V. El tratamiento de la lepra con cycloserine. [**The Treatment of Leprosy with Cycloserine**] *Bol. Soc. Cubana de Dermat. y Sifil.* 1958, Mar., v. 15, No. 1, 16–28. [10 refs.]

10 leprosy patients were treated for periods of 3 to 14 months with Cycloserine. The dose was 3 or 4 tablets of 250 mgm. daily. The drug was well tolerated and there were no complications except in 1 case insomnia and irritability. There was general clinical improvement, but in no case had the signs entirely disappeared. None of the patients became bacteriologically negative, but the bacilli became granular in appearance. It is considered that Cycloserine is an excellent addition in the treatment of leprosy, and that it should be tried out on a large scale.

Full case notes are given for all 10 patients. *Ernest Muir*

Montestruc, E., with the collaboration of D. Garcin, R. Berdonneau & J. Benoist. La prophylaxie antilépreuse chez les enfants contacts de lépreux à la Martinique. [**Prophylaxis against Leprosy in Children in Contact with Leprous Patients in Martinique**] *Arch. Inst. Pasteur de la Martinique.* 1958, Jan.–Apr., v. 11, Nos. 1/2, 18–27. [10 refs.]

Of the last 100 cases of familial leprosy diagnosed, 51 patients had been infected by brothers or sisters, 18 by maternal and 14 by paternal relatives, 9 by uncles or aunts, 7 by cousins, and 1 was conjugal. The frequency of collateral as compared with conjugal infection is taken to emphasize the susceptibility of children, as compared with adults, to leprous infection.

In the last 7 years in Martinique 391 new cases of leprosy in subjects less than 20 years of age were diagnosed; of these 20·4% were lepromatous, 14·3% tuberculoid, and 65·2% indeterminate. The tuberculoid form, which occurs in the most resistant patients, is the least common in young subjects.

Figures are given to show that the incubation period is particularly short in very young infants. Thus in 4 infants the incubation periods between first possible contact and the first appearance of signs of disease were respectively: 4 months, 1 month, 1 month and 3 weeks. In all of these the bacteriological examination was positive.

As measures of control, all persons living in contact with every diagnosed case of leprosy are examined as to their immunity, are examined clinically and bacteriologically, and are eventually vaccinated with BCG. In this way during the last 4 years 376 children have come under supervision and examination. The measures adopted for control are summarized as follows: (1) In the epidemiological and immunological approach to leprosy, and likewise in attempts to cultivate and inoculate in animals the leprosy bacillus, the disease should be approached from the same angle as tuberculosis. (2) The measures mentioned above for supervision of children living in contact with leprous patients should be carefully adopted. (3) In

an endemic country children should be vaccinated with BCG at birth, and children not reacting to tuberculin should be vaccinated and revaccinated with BCG. (4) In subjects with positive lepromin and negative tuberculin reactions it is understood that *Myco. leprae* is alone responsible for these results; there is need therefore in that country for joint investigation of the nature of these reactions, so as to coordinate preventive measures. (5) Vaccination with BCG may be considered in certain circumstances when child contacts with leprous patients are allergic to *Myco. tuberculosis* and anergic to *Myco. leprae*. *Ernest Muir*

GARBUTT, Elizabeth W., REES, R. J. W. & BARR, Yvonne M. **Multiplication of Rat-Leprosy Bacilli in Cultures of Rat Fibroblasts.** *Lancet.* 1958, July 19, 127–8. [13 refs.]

Recently there have been reports of significant but limited growth of *Mycobacterium leprae-murium* in tissue culture of rat spleen cells [REES and WONG, this *Bulletin*, 1958, v. 55, 661; WALLACE *et al.*, *ibid.*, 1958, v. 55, 660] and in monocytes [HAWKING, *ibid.*, 1958, v. 55, 901]. In the present preliminary communication claims are made to have grown this organism in rat fibroblast cells without hydrocortisone, thus contrasting with the results of Wallace *et al.* [*loc. cit.*], who detected growth in these cells only when sufficient hydrocortisone was present to damage the cells.

The 14pf strain of fibroblasts was used and it was grown in 50% human cord serum + 50% Hanks' balanced salt solution for 7–10 days in Pyrex feeding-bottles. During the time of infection with the bacilli, which were derived from livers of mice infected intravenously, the cells were in the salt solution containing 0·0125% albumin, and ingestion of the bacilli was allowed to take place for 24 hours, during which 90% of the cells ingested from 1 to more than 10 bacilli. The cells were then trypsinized, washed in the salt solution to remove extracellular bacilli, and resuspended in the growth medium. Each culture was done in triplicate and after 13, 26 and 39 days' incubation a total bacterial count was done on 1 of each of the cultures. The counts were made after the cells had been disintegrated in an ultrasonic vibrator, by means of a modification of the smear method of Breed [HOBBY *et al.*, *ibid.*, 1954, v. 51, 808].

The results of 9 experiments are presented and 8 show a significant increase in the number of bacilli. The increases ranged from 2·0- to 5·3-fold. In most of these experiments no increase occurred after 13 days' incubation but in 3 the number present at 39 days was greater than at 26 days, the increases being 3·1-, 4·4- and 5·5-fold. No increase was observed in the presence of 100 μgm. streptomycin per ml. and 0·1 μgm. isoniazid per ml., and 0·05 and 0·1 mgm. of hydrocortisone per ml. had no effect on the multiplication.

These results are considered promising in that the tissue cells are an

established and unmodified line of cells, offering a reasonable system in which to study the conditions required for continuous multiplication of this organism. *S. R. M. Bushby*

Ito, T., Sonoda, R. & Kosaka, K. **Biochemical Studies on Murine Leprosy Bacilli. I. Collection of Bacilli from Infected Tissue.** *Med. J. Osaka Univ.* 1958, Mar., v. 8, No. 4, 633–8, 1 fig. & 1 chart.

"1. The highest yield of organism is obtained by treatment with trypsin and centrifuging.

"2. Trypsin gives a greater purity without conglomeration of organisms.

"3. Viability is reduced by homogenation and trypsination but mice become infected in 120 days with 10^{-5} mg.

"4. Oxygen consumption is also affected by homogenation and trypsination and there is a decrease of about 40%. Homogenation alone causes a decrease of about 15%."

Kawaguchi, Y. [**Strains of Mice for Experimental Murine Leprosy. Part 2. The Relation between Strains of Mice and Effects of BCG in Murine Leprosy**] *Lepro.* 1958, Jan., v. 27, No. 1, 44–8, 1 chart. [**Part 3. Strains of Mice for Experimental Chemotherapy of Murine Leprosy**] *Ibid.*, 49–53, 2 charts. [In Japanese.]

The English summary appended to the paper is as follows:—

"For the purpose of selecting a mouse strain adequate for immunological experiments, comparative observations were made of the effects of BCG vaccination on the onset of murine leprosy in various uniform strains of mice (C 57 BL, dd, CFW, CF 1, and C 3 H). Mice used were of approximately the same age, and lived under the same dietary and environmental conditions.

"It was found that two strains, C 3 H and CF 1, were adequate for immunological experiments in that the leproma developed to a much larger size whereas ulcers developed more slowly.

"In strains in which the leproma generally remained small and the ulcer formed early, such as C 57 BL, the differences between the vaccinated and non-vaccinated mice were less marked although the lepromas were palpable in the earlier stage of infection. Therefore, these strains seemed inadequate for the study of immune responses."

Tanimura, T., Nishimura, S. & Tanimura, Y. **Studies on the Immunology of Murine Leprosy. Effects of Vaccinations and Previous Infection.** *Internat. J. Leprosy.* New Orleans. 1957, July–Sept., v. 25, No. 3, 247–56.

Rats were used in these experiments and the *Mycobacterium lepraemurium* used in the vaccines were from leproma, heated for 30 minutes

at 100°C. The challenge inoculum was injected subcutaneously and the effects of the vaccine were judged by the size of the lesions that developed during the succeeding 5 months.

In the first experiment, groups of 5 rats were injected during 1 week with 2, 3 and 4 doses of the vaccine suspended in saline and challenged 1 month later. 1 month after challenge there was no evidence of infection in any of the vaccinated animals although there were signs in 3 of the 8 surviving control groups of 10 animals, but after 3 months, infiltrations were present in all of the surviving rats that received 3 and 4 injections of the vaccine but not in any of those that received 2 injections. By the fifth month, however, there was no significant difference between the vaccinated and unvaccinated animals.

In a second experiment, the vaccine was given the day after infection, the dose repeated once, a week later in 1 group, and twice and thrice, at weekly intervals, in 2 other groups. In this experiment, the delaying effect of vaccination was again seen.

In a third experiment, 5% liquid paraffin was added to the vaccine and its effects were compared with those of a similar oil-based vaccine of a non-pathogenic mycobacterium grown on Petragnani's medium. The leproma vaccine again conferred some immunity, for the development of the lesions in the animals receiving this vaccine lagged behind those of the animals receiving the non-pathogenic vaccine. Comparison of the lesions in this experiment with those of the vaccinated and unvaccinated animals of the first and second experiments indicated, however, that even the non-pathogenic vaccine afforded some immunity and that the oil-based vaccine was superior to the saline one.

In the final experiment the effects of superinfection were observed in 40 rats which had survived an inoculation of leproma 5 months previously. The rats were divided into 3 groups and injected subcutaneously with 10^{-2}, 10^{-3} and 10^{-4} dilutions, respectively. In all of the groups the rate of development of the leproma was delayed, compared with that of the controls—previously uninfected animals. The difference was, however, most marked in the animals given the smallest inoculum, there being no evidence of infection at the 5th month, thus giving emphasis to the recognized need for careful choice of challenge dose for demonstrating immunity to mycobacteria. There was no evidence of a reaction resembling a Koch phenomenon at the site of the second injection.

These results thus indicate that some immunity can be attained by the injection of killed or live rat-leprosy bacilli in rats and possibly by other mycobacteria. *S. R. M. Bushby*

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—TREMATODES (*schistosomes, other flukes*); CESTODES (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); NEMATODES (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

HERNÁNDEZ VALLADOS, R. Desparasitación intestinal masiva aplicada a programas de salubridad. I. Tetracloretileno. [**Mass Treatment of Intestinal Helminthic Infections applied to Health Programmes**] *Bol. Epidemiológico*. Mexico. 1957, Oct.–Nov.–Dec., v. 21, No. 4, 107–12.

A study of 969 patients with intestinal worms.

i. PITCHFORD, R. J. **Bilharziasis Survey in Basutoland, March 1956.** *Bull. World Health Organization*. Geneva. 1958, v. 18, Nos. 5/6, 1049–50.

ii. ————————. **Bilharziasis Survey in Bechuanaland, March 1956.** *Ibid.*, 1050–52.

iii. FRAGA DE AZEVEDO, J. **Human Bilharziasis in the British Cameroons.** *Ibid.*, 1052–7.

i. Basutoland has an annual rainfall of 400–500 mm. and temperature extremes from 31°C. to −1°C. It is grassland country, heavily grazed and deeply eroded. Schistosomiasis is very rare and a history of travel to Natal or the Transvaal is obtained from practically all diagnosed patients. Rectal biopsies on 98 schoolchildren were all negative and no adult schistosomes were found in 5 cattle carcases examined. The following snail species were found: *Bulinus* (*Bulinus*) *tropicus*, *Lymnaea truncatula*, *Gyraulus* spp. and *Ancylus* sp.

ii. The central, southern and western districts of Bechuanaland are mostly desert. The bulk of the population lives in a narrow eastern strip; there is also a settlement round Lake Ngami in the north-west. In the eastern area, *B. tropicus* and *B. forskalii* are common and widespread. *B.* (*Physopsis*) *africanus* was found in man-made dams and a canal, and *Gyraulus* sp. was found in 1 swamp. In Mochudi, on the banks of the Notwani River, 84% of 500 children examined were found to be infected with *Schistosoma haematobium* in 1933. 65% infection was found in 1940. Near Palapye, in a tributary of the Limpopo dammed in 2 places, *B.* (*P.*) *africanus* were found in large numbers, shedding mammalian type cercariae. Schistosomiasis has never been diagnosed near Lake Ngami, perhaps because of sparse population and rather frequent winter frosts. The following snail species were found: *B.* (*P.*) *africanus*, *Biomphalaria* sp., *Lymnaea* (?) *natalensis*, *Lanistes* sp., *Pila* sp., *Viviparus* sp., *Gyraulus* sp.

iii. The northern region of the British Cameroons consists of West African savannah. The southern region is mountainous and afforested, and has very high rainfall. There are 3 lakes and a number of rivers in the south. The north is drained into the Chad and Benue basins; it is flat and liable to flooding during the rains. Schistosomiasis was introduced repeatedly into the northern region in ancient times, by invading forces from the Sudan area. Nevertheless, an investigation in the vicinity of irrigation works near Lake Chad showed only 9·1% vesical infection. The author has not had access to the figures from recent surveys carried out in the north by medical field units. In the south, as far as is known, schistosomiasis exists only in the vesical form and is limited to two foci around lakes. The snail populations of these are not known in detail, but *Bulinus* is present in both and *Pyrgophysa forskalii* and *Biomphalaria* are found in the vicinity. In the north *Biomphalaria*, *Bulinus* (*Physopsis*) and *Bulinus* of the *forskalii* group are common. *B. B. Waddy*

PITCHFORD, R. J. **Animal Reservoirs of Human Bilharziasis in the Eastern Transvaal.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 1080–81.

Schistosome ova were found in domestic animals in the *middelveld* and *lowveld* of the Eastern Transvaal (altitude below 1,000 m.) as follows:

	Number examined	*Number with adult worms in mesenteric veins*	*Number with lesions and ova in bladder*
Cattle	346	246	12
Sheep	12	8	0
Goats	4	2	0
Total	362	256	12

These ova, which appear to be identical, are longer than those of *S. haematobium*, have a well-marked shoulder anterior to the spine and a drawn-out anterior end. The same ova were found by rectal snip in 5% to 10% of African children in Komatipoort in the *lowveld*. They are always mixed with *S. mansoni* and sometimes with viable *S. haematobium*. In rectal snips they are clustered together and have no contact with viable *S. haematobium* ova. Schistosome ova of domestic animals found in the human rectum are usually viable.

Studies are in progress to identify this schistosome of domestic animals which infects man. *H. J. O'D. Burke-Gaffney*

WALKER, A. R. P. **Studies on Parasitism and the Nutritional State.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 1103–5.

For some years, the author and his colleagues in the South African Institute for Medical Research have been studying problems associated

with parasitism and blood loss, especially the claim that some parasites may cause or exacerbate hypochromic anaemia. He gives brief notes on some of these studies, with much of which readers of this *Bulletin* will be familiar.

Blood loss in ankylostomiasis in some studies was shown to be irregular and not exclusively dependent on worm load, though it might well be greater when the load is excessive [this *Bulletin*, 1954, v. 51, 1078]. This blood loss is in harmony with the hypochromic anaemia seen in areas where the parasite is common.

Blood loss in urinary schistosomiasis in a series of Bantu schoolchildren showed wide daily variation [*ibid.*, 1953, v. 50, 730]. It required only a small amount to impart colour to the urine; it seems likely that anaemia may have been exacerbated, but not caused, by the haematuria. The loss of blood in the stools in *S. mansoni* infections was very small [*ibid.*, 1955, v. 52, 278].

Cases of anaemia were negligible in both forms of schistosomiasis. This is contrasted with other areas where anaemia in schistosomiasis is common and may be severe; yet anaemia is equally common when schistosomiasis is not present, but malaria exists. The rarity of such anaemia in the South African Bantu may be due to their high iron intake [*ibid.*, 1954, v. 51, 974; 1955, v. 52, 1223].

Two neighbouring schools near Rustenberg, with different water supplies, one in which there is schistosome infestation and one in which it is absent, are undergoing a survey. This includes dietetic, anthropological, clinical, physiological, parasitological and other studies [see also *ibid.*, 1952, v. 49, 714]. Up to the present the results suggest that the difference between the findings in the infected and non-infected children is small, and this would suggest that the handicap of schistosomiasis may be less than is usually believed. *H. J. O'D. Burke-Gaffney*

DE MEILLON, B. & HOLLINGHAM, E. A. **Observations on the Bilharzia Complement-Fixation Test in Schoolchildren after Successful Treatment.** *Bull. World Health Organization.* Geneva. 1958. v. 18, Nos. 5/6, 1108–9.

The authors, in Johannesburg, carried out the "bilharzia complement-fixation test" [this *Bulletin*, 1954, v. 51, 71] on European children aged 14 to 17 years, who were suffering from proved urinary schistosomiasis. Only those who were successfully treated and whose urines remained negative were considered for this study, which continued for 40 months.

The results were as follows:

	Months elapsed since successful treatment						
	0	*4*	*12*	*17*	*22*	*29*	*40*
Number tested	18	17	15	16	16	16	10
Number positive	18	16	11	12	12	4	9

There was considerable variation in the number positive to the test in each month, and the results were less consistent with time than might have been expected. It is evident that the negative results obtained at 29 months were not sustained. The results were also erratic in the same patient; this may have been due to variations in the titre of the antibody. Detailed results are given for 6 children and it can be seen that the findings varied between positive and negative at different times.

The authors conclude that this complement-fixation test under the conditions of the study cannot be used to assess cure 40 months after treatment, unless the results are consistently negative.

H. J. O'D. Burke-Gaffney

PITCHFORD, R. J. **Observations on the Mass Treatment of Bilharziasis in South Africa.** *Bull. World Health Organization.* Geneva. 1958, v. 18, Nos. 5/6, 1112–13.

In 1953, the author carried out treatment of schistosomiasis in the Transvaal with Nilodin and with Miracil D and he gives brief notes on the results.

Treatment with one or the other drug was given to 64 adults and children in an area in the Eastern Transvaal where there was an irrigation scheme and copper sulphate had been used as a molluscicide for 2 years. The total dose was 130 mgm./kgm. over a period of 6 days. One stool and one urine specimen were examined before and after treatment. The results were as follows:

No. treated	*Drug used*	*No. positive before treatment*	*No. positive 3–4 months after treatment*
30	Miracil D	24 *S. haematobium* 21 *S. mansoni*	12 *S. haematobium* 21 *S. mansoni*
34	Nilodin	27 *S. haematobium* 23 *S. mansoni*	12 *S. haematobium* 15 *S. mansoni*

60 children with *Schistosoma mansoni* infections in an area where no snail control measures were in use were treated with Nilodin twice daily for 14 days with a total dose of 130 mgm./kgm. At 3 months all were still positive.

8 adults with *S. mansoni* infection in an area without snail control measures were treated with 130 mgm./kgm. Nilodin over 1 week: the treatment was repeated one month later. At the end of 3 months all were positive.

At Rustenberg in the high *veldt*, treatment was given to 54 African schoolchildren all suffering from *S. haematobium* infection, but without *S. mansoni*. They were given 120 mgm./kgm. Miracil D over a period of 5 days. After 8 weeks 40, and after 16 weeks 35, were positive.

The author concludes that his results agree with those of KING [this *Bulletin*, 1955, v. 52, 553] who used Nilodin in both varieties of schistosomiasis in a mine in the Transvaal.

Fuadin in "the usual recommended therapeutic dose" was given daily for 10 days by the intramuscular route to 200 Africans on a European farm. At the end of the 10 days only 35 had completed the course, despite supervision, and after 12 days 6 more had completed it.

It would seem that, with the drugs available at present, mass treatment is of doubtful value in attempting to control schistosomiasis in South Africa. *H. J. O'D. Burke-Gaffney*

Shafei, A. Z. **Preparation 17581 (Hydrochloride of I-B-Diethylamino-Ethylamino-4, 6, 8 Trimethyl-Azathioxanthone). Clinical Trials on Patients infected with** *Schistosoma haematobium*—**a Preliminary Report.** *J. Egyptian Med. Ass.* 1958, v. 41, No. 1, 6–10. [11 refs.]

This new thioxanthone compound, which shows moderate schistosomicidal active *in vitro*, was used for the treatment of patients, in Egypt, suffering from urinary schistosomiasis. The total of 60 patients was divided into 2 groups. Those in the first group were given a daily dose of 10 to 15·6 mgm./kgm. by mouth for 10 days (gross dosage 100 mgm./kgm.); those in the second 8·3 to 12·5 mgm./kgm. daily for 21 to 24 days (gross dosage 175 to 262·5 mgm./kgm.). The side-effects of treatment were similar to those caused by the other thioxanthone drugs. Observations were continued on a diminishing number of patients at intervals over a period of 3 months. The apparent cure rate in the first group (lower gross dosage) patients was rather higher (one-third) than that in the second (one-quarter) within a 2-month observation period; but the higher daily dosage caused more prominent side-effects, and therefore cannot be recommended for continuation over the longer period. Possibly the cure rate might be increased by following the first course of treatment, after an interval, by the second. *A. R. D. Adams*

Leite, G. Simpósio sôbre esquistossomose. Organizado pelo Hospital Naval do Salvador. [**Symposium on Schistosomiasis organized by the Naval Hospital of Salvador, Brazil**] *Rev. Brasileira Med.* Rio de Janeiro. 1958, Apr., v. 15, No. 4, 249–58, 1 fig. English summary.

See this *Bulletin*, 1958, v. 55, 417.

Martins, Regina de S. Focos ativos de esquistossomose em Niterói, Estado do Rio de Janeiro. [**Active Foci of Schistosomiasis in Niteroi, Rio de Janeiro State**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1957, July, v. 9, No. 3, 361–4.

The English summary appended to the paper is as follows:—

"When surveying Niteroi for planorbids, we found seven foci (some of

them in the central section of the town) with snails naturally infected with *S. mansoni*. As far as we know that was the first time in which naturally infected snails were found in the State of Rio de Janeiro.

"All the specimens examined were considered by us to be *Australorbis nigricans* and such diagnosis has been confirmed by experts to whom some samples were sent. Nearly all the patients with schistosomiasis were persons who worked in kitchen-gardens.

"In Niteroi schistosomiasis may be considered as gardeners' occupational disease."

RUIZ, J. M. Estudo sôbre *Planorbis melleus* Lutz, 1918. Posição da espécie no gênero *Drepanotrema* Fischer & Crosse, 1880. [**Studies on *Planorbis melleus*. Position of the Species in the Genus *Drepanotrema***] *Rev. Brasileira Malariologia*. Rio de Janeiro. 1957, Jan., v. 9, No. 1, 51–6, 9 figs. on 2 pls. [11 refs.] English summary. (3 lines.)

FERGUSON, F. F., DE COLON, Aida Z. & ZAYAS, Maria V. **Potassium Hydroxide—Centrifugation Method for Detection of *Schistosoma mansoni* Eggs in Feces.** [Research Notes.] *J. Parasitology*. 1958, June, v. 44, No. 3, 290.

The authors, from Puerto Rico, make the point that the sodium-sulphate-Triton-ether centrifugation test for detection of *Schistosoma mansoni* eggs is relatively complex and expensive for mass testing.

They now describe a method which is simple, inexpensive and rapid. 1 gm. of faeces is mixed with 5 ml. of 5% KOH and the mixture is allowed to stand for 1 hour at room temperature, after which it is filtered through gauze and centrifuged at 1200 r.p.m. When the sediment is examined microscopically, it is found that schistosome eggs are sharply outlined and readily distinguished from extraneous matter. Comparative tests of 276 faecal samples by both methods showed that the KOH technique was in general as efficient as the sodium-sulphate-Triton-ether method. 123 tests were positive by the latter, 106 by the KOH method and 79 by both.

H. J. O'D. Burke-Gaffney

MARQUES, R. J. A propósito da chamada fase toxêmica da esquistossomose mansônica. [**The So-Called Toxaemic Stage of Mansonian Schistosomiasis**] *Anais Facul. Med. Univ. do Recife*. 1957, Dec., v. 17, No. 2, 243–56, 2 figs. on pl.

The author refers to the frequency of *Schistosoma mansoni* infection in the State of Pernambuco, Brazil, and the rarity of the acute form of the disease. The importance of research into this aspect of schistosomiasis

lies in the need for early treatment so that the condition can be controlled before it reaches a stage when it is more resistant to therapy.

An opportunity to study the immediate results of exposure to *S. mansoni* cercariae arose in the town of Olinda in August 1955, when the author had occasion to examine 2 young men with unexplained febrile disease which had resisted exhaustive treatment. Careful investigation revealed that the patients were 2 of a party of 8 exuberant youths who had decided to bathe in a drain which was part of a system draining waters from a profuse breeding place of *Australorbis glabratus*.

The 2 youths in question were studied carefully and full clinical details are given. Each had bathed in the drain for 2 hours, at the end of which they developed intense itching and generalized urticaria. Within 3 days in one case and 1 week in the other, the patients developed a febrile disease, with diarrhoea, generalized pains, bloody sputum, headache and vomiting. Blood examination showed eosinophilia of 12% and 17% respectively, rising later to 45% and 43%. The intradermal test for schistosomiasis was done after 10 to 15 days and was strongly positive in both patients. At the same time the faeces of the first patient showed *S. mansoni* ova: the second was negative, but was subsequently shown to be positive. X-ray of one patient showed shadows around the hilus of the right lung and micronodules at both bases.

Both patients responded rapidly to antimony treatment, although the eosinophilia later rose to 62% and 68% respectively, and, as far as follow-up could be carried out, *S. mansoni* ova persisted for some time. However, they were eventually regarded as cured, though follow-up will be continued.

It was possible to obtain some details about the 6 other youths concerned. One of them proved to have a strong positive intradermal test for schistosomiasis. Another had a very severe pruritus within 5 minutes of leaving the water, but did not develop further symptoms: it proved however, that, unlike the first two patients, he had previous exposure in other infected waters and had presumably acquired some immunity. The remaining 4 youths also suffered some pruritus, but they had had only a little intermittent contact with the infected water during the escapade and it is suggested, therefore, that the number of cercariae penetrating the skin was insufficient to produce the toxaemic condition.

The author speculates on the possibility of producing artificial immunity to schistosomiasis by some method of vaccination or exposure to minimal quantities of cercariae, preferably from male worms [for previous studies on acute schistosomiasis see this *Bulletin*, 1958, v. 55, 908]. *H. J. O'D. Burke-Gaffney*

DE SOUZA, A. M. F. & SOBRAL, Maria C. B. Variação das frações proteicas na esquistossomose experimental. [**Variation in Protein Fractions in Experimental** *Schistosoma mansoni* **Infection**] *Anais Faoul. Med. Univ. do Recife*. 1957, Dec., v. 17, No. 2, 266–7.

In order to study the proteins in the blood of guineapigs infected with *S. mansoni*, the authors first estimated the protein fractions in normal animals. An electrophoretic method was used. The results of tests in 12 guineapigs selected at random are shown in a table, and may be summarized as follows:

	Mean percentage	*Standard Deviation*
Albumin	51·75	5·35
Alpha 1 globulin	4·43	2·40
Alpha 2 globulin	16·60	3·63
Beta globulin	15·07	3·01
Gamma globulin	12·09	1·96

H. J. O'D. Burke-Gaffney

Magalhães, A., Jr. & Coelho, R. de B. Patogênese da fibrose hepática provocada em camondongos infestados com *S. mansoni*. [**Pathogenesis of Liver Fibrosis in Mice infected with** *Schistosoma mansoni*] *Anais Facul. Med. Univ. do Recife*. 1957, Dec., v. 17, No. 2, 187–95, 10 figs. on 5 pls. [13 refs.]

The authors, from Recife, Brazil, refer to previous studies by themselves and others on hepatic lesions in laboratory animals infected with *Schistosoma mansoni* [this *Bulletin*, 1954, v. 51, 70; 1955, v. 52, 175; 1957, v. 54, 715, 1426].

They now describe a study of such lesions produced in mice by dead worms and the various stages of development found. The mice were infected by tail-immersion with cercariae from naturally infected *Australorbis glabratus*. 3 groups of 20 mice each received, respectively, 900, 600 and 300 cercariae per mouse. 35 days later the mice were treated with Fouadin to eliminate the presence of ova. In practice, no live worms were found at autopsy of the mice, which in general died either during or soon after treatment or between 2 and 4 or 5 weeks, according to the intensity of infection. The results are discussed in detail and illustrated in 10 photomicrographs. Some mice survived as long as 13 weeks and findings are given for those which died during treatment or 30, 40, 60 and 80 days thereafter.

The first hepatic changes brought about by the dead worms took the form of swelling and leucocytic infiltration of the local portal space: as this intensified the body of the dead worm itself was infiltrated by leucocytes. After 30 days the worms were almost completely reduced to eosinophilic masses, there was necrosis in the portal area and in much of the hepatic parenchyma. After 40 days intense macrophage phagocytosis developed and was followed by the appearance of fibroblasts at the periphery and the lesion began to contract: after 80 days fibrosis was seen in isolated areas and newly formed capillaries developed. Cicatricial contraction produced deformity of the hepatic lobules.

H. J. O'D. Burke-Gaffney

Lagrange, E. Infections unisexuées et possibilité de guérison de bilharziose à *S. mansoni* chez la souris. [**Unisexual Infections and the Possibility of Cure of *Schistosoma mansoni* Infections in Mice**] *Riv. di Parassit.* Rome. 1958, Jan., v. 19, No. 1, 59–66.

The English summary appended to the paper is as follows:—

"Bilharzial infections of mice infected with cercariae originating from a single planorbis (normally infected by several miracidia) produce three types of infections: a) unisexual and sterile; b) bisexual and sterile or not sterile; c) or with abnormal production of pseudohermaphrodite adults of an aspect unseen before."

Pesigan, T. P., Farooq, M., Hairston, N. G., Jauregui, J. J., Garcia, E. G., Santos, A. T., Santos, B. C. & Besa, A. A. **Studies on *Schistosoma japonicum* Infection in the Philippines. 1. General Considerations and Epidemiology.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 3, 345–455, 30 figs. [Numerous refs.]

The authors' summary in French is freely translated as follows: Schistosomiasis, due to *Schistosoma japonicum* in the Philippines, was first described in 1906. The finding of the vector in 1932 was the starting-point in control measures. Infection of troops stationed on Leyte Island in 1944 gave renewed interest to the problem. The extent of the infection having been investigated, a control campaign was begun in 1953 by the Philippine Government with the technical aid of WHO.

The authors give an account of epidemiological studies carried out in the course of the project. Fundamental data were acquired in the region of Palo and in the control zone adjacent to Tanauan. The incidence there is 48% and 46% respectively, with a maximum in the age-group 20–24 years at Palo and in the age-group 10–14 years at Tanauan. The highest incidences are in the villages among the men and the farmers.

A quantitative estimate of the infection has been attempted as well as a classification by degree of infection, into which the category "incapable of work" has been introduced. 62·5% of the infected people show no clinical symptoms. Among the clinical cases, benign forms of the disease predominate, especially in the coastal regions. It is the children of 10–14 years who suffer most. Among adults, a tolerance of the parasite seems to explain the frequency of asymptomatic cases. Over the critical age of 10–14 years, acute manifestations of the disease are rare. Frequent exposure to infection seems to induce an immunity which has been confirmed experimentally in the rhesus monkey. The number of new cases during the year has been estimated at 20·4%, by subsequent examination of 200 children who were negative at the beginning of the investigation. Infection of children by other intestinal parasites prevents an exact evaluation of the role of schistosomes in disease.

Man is the chief source of infection; the dog and the cow play an equal part and it is important that their number should be kept under control. From the point of view of public health, it is the children of 10–14 years who are the most important reservoir of the disease. *S. japonicum* is very hardy on account of its fertility. The number of eggs varies according to the infected host. In mice the authors have shown that, 17 days after maturity, a female worm lays 1,200 eggs per day.

J. J. C. Buckley

Pesigan, T. P., Hairston, N. G., Jauregui, J. J., Garcia, E. G., Santos, A. T., Santos, B. C. & Besa, A. A. **Studies on *Schistosoma japonicum* Infection in the Philippines. 2. The Molluscan Host.** *Bull. World Health Organization.* Geneva. 1958, v. 18, No. 4, 481–578, 38 figs. [21 refs.]

The authors' summary in French is freely translated as follows:

Oncomelania quadrasi is the only known vector of *Schistosoma japonicum* in the Philippines. This snail is found in island regions of low elevation and when a dry season does not exist. A water course whose slope and delivery of water are adequate, together with a soil of favourable texture comprise the ingredients of a favourable habitat. The authors describe in detail the biology of the snail from field and laboratory observations. Mating is at a maximum in September and at a minimum in June. In the field, changes in the population density are small and depend more on the nature of the habitats than on the seasons. Control measures based on reduction of the snail population are quickly nullified by the rate of repopulation. A reduction of 75–95% is compensated in a few months. For this reason control measures which do not profoundly modify the habitats, for example by the use of molluscicides, have only a temporary effect and must be repeated frequently.

The infection by schistosomes has an adverse effect on the snails, by slowing down their growth and reducing their rate of reproduction. It is not known if a snail can become free of its infection. A higher proportion of female snails than of males becomes infected. Infected snails emit about 5 cercariae in 2 days. This emission begins on an average about 63 days after infection. Cercariae are emitted usually in the evening between 18 and 23 hours when the snail has been exposed to a moderate light for 12 hours. The water downstream of a habitat should be considered virtually infective. Mice have been infected by water collected 1 kilometre downstream of a habitat. The infection rate of the snails exhibits an annual periodicity. The maximum rates were observed about 8 weeks after the heavy rains. This period of 8 weeks corresponds with the incubation time of the infection. The authors concluded that the rains facilitate snail infection by raising the water level which results in the penetration of snails by the greatest number of miracidia and by

washing down faecal material deposited on the edges of water courses, into the water itself.

[The original long and comprehensive papers should be studied in full.]

J. J. C. Buckley

Shih, Yu-Ch'üan, Ch'en, Yu-Hsin & Chang, Yuan-Ch'ang. **Paragonimiasis of Central Nervous System. Observations on 76 Cases.** *Chinese Med. J.* Peking. 1958, July, v. 77, No. 1, 10–19, 8 figs. on 2 pls.

This article discusses the diagnosis, pathogenesis and treatment of paragonimiasis of the central nervous system, in the light of experience drawn from a remarkably large series of cases. The diagnosis was based on (a) the concurrence of pulmonary paragonimiasis with the neurological syndrome, (b) abnormal findings in the cerebrospinal fluid, including an eosinophilic pleocytosis, the presence of *Paragonimus* ova and a positive complement-fixation test and (c) abnormal radiological findings. The onset of neurological symptoms succeeded those arising in the chest by an average period of 10 months. The lesion occurred in the brain in 68 out of the 76 patients proved to have the disease, in the spinal cord in 5 patients and at both sites in the remaining 3. The presenting symptoms comprised headache (50%), epileptiform convulsions (40%) and motor disability (10%). Impaired vision was found in about half the subjects, due, in nearly every instance, to a lesion of the occipital lobe or within the optic radiation. The most useful method of localization of the cerebral lesions proved to be air encephalography whereby it was often possible to demonstrate a space-occupying lesion together with varying degrees of cerebral atrophy, indicated by ventricular dilatation and widening of the subarachnoid space. Contraction of the abscess mass may draw the ventricular system towards the side of the lesion.

Complete excision of the lesion is the treatment of choice, though in some cases partial removal only can be achieved. Of 12 specimens which were resected entirely, an adult fluke was found in 8 instances.

In the 8 patients with spinal involvement, the mean incubation period was 5 months longer than that of the cerebral disease. The lesion tended to occur below the tenth thoracic vertebra and to be extradural, causing paraplegia, spinal block and pressure erosion of the vertebral peduncles.

The mechanism by which the parasite reaches the central nervous system is undecided. Since the authors have demonstrated adult flukes in many cerebrospinal lesions they postulate direct invasion of the skull *via* the basal foramina and of the spinal canal *via* the intervertebral spaces. They point out that egg embolization would not lead to the development of adult worms within the brain, nor would it favour the characteristic basal localization within the temporo-occipital lobes. Though ability to migrate within the human body was believed to be a property only of the larval phase of the fluke, the authors hold that the

adult is also capable of this. The arrival of adult flukes within the brain and their ovulation, give rise to a widespread meningo-encephalitis, while atrophy follows their subsequent death. The recovery of viable flukes at operation, in patients who had previously received as many as four courses of emetine and chloroquine, suggests that surgery alone offers hope of cure, provided the lesion can be localized. *J. H. Walters*

ROMAN, E. Possibilité d'infestation par *Hymenolepis nana fraterna* des Rongeurs adultes traités par la cortisone. [**Possibility of Infection with *Hymenolepis nana fraterna* in Adult Rodents treated with Cortisone**] *C.R. Soc. Biol.* 1958, v. 152, No. 1, 105–7.

BAILENGER, J. État actuel de l'épidémiologie de l'échinococcose dans le Sud-Ouest de la France. [**Present Position regarding the Epidemiology of Echinococcosis in South-West France**] *Rev. d'Hyg. et de Méd. Sociale.* Paris. 1957, Dec., v. 5, No. 8, 707–40, 2 maps & 1 chart. [25 refs.]

In the course of this epidemiological study of echinococcosis in 8 Departments in South-West France, the assistance of 183 doctors and 20 veterinary inspectors at abattoirs was enrolled and a close liaison was maintained with the departments of health, veterinary services and agriculture. Of 159 human cases recorded between 1945 and 1953, the majority were from Gironde, Landes and Basses-Pyrénées, but the incidence from the Pyrenean zone is thought to be an underestimate. The incidence in cattle and sheep is 25 to 30% and occurs mainly in Basses-Pyrénées and Landes. The incidence in pigs is only 3%. (The incidence of canine echinococcosis (1·9%) was determined by faecal examination only of 102 dogs and has little value.)

From available data it is concluded that hydatid of the liver of man was more frequent than that in the lung in both sexes. In animals it was the same, though in sheep the lungs are frequently infected. Women have a higher percentage (58·8%) of infection than men (41·2%).

The results are discussed very fully and set out in 12 tables and observations are made on geographical distribution, localization, age, sex, occupation and epidemiology. *J. J. C. Buckley*

CABALLERO Y C., E. Un caso humano de cenurosis cerebral en Mexico. [**A Human Case of Cerebral Coenurus Infection in Mexico**] *Acta Zool. Mexicana.* 1956, Dec. 15, v. 1, No. 13, 1–7, 5 figs. (4 on 2 pls.) [23 refs.] English summary (9 lines).

Magaudda-Borzì, L., Zitelli, N. & Agostino, E. Risultati di una inchiesta sulla diffusione dell'Anchilostomiasi in alcuni Comuni della Provincia di Reggio Calabria. [**Ankylostomiasis in Reggio Calabria Province**] *Nuovi Ann. d'Igiene e Microbiol.* 1958, May–June, v. 9, No. 3, 231–41. [23 refs.] English summary.

This paper gives a detailed account of a hookworm investigation in certain communes of the province, especially round Mammola. The area has an approximate population of 54,000, and, dividing it into urban and rural areas, the authors examined 1,253 persons (4·17%) in the urban, and 4,164 (17%) in the rural area, with the NaCl enrichment method. The results showed that 51% of the urban, and 37·5% of the rural population were positive, the percentage of schoolchildren positive being 25% in each.

The bad hygienic conditions in the schools are regarded as contributing to this high percentage. The disease continues to extend and though diagnostic and treatment centres have been set up by the ACIS, the authors advise intensive propaganda in the homes, schools, and work-places, and treatment of the soil as well as the patients.

[The conditions in the towns and villages as described are so bad that the schoolchildren are probably infected before they are of school age; while the general poverty is so great that the province and the communes can do scarcely anything themselves to remedy them.]

W. K. Dunscombe

Magaudda-Borzì, L. & Mastroieni, F. Primi risultati di una inchiesta sulla infestazione da "Ancylostoma duodenale" in Faro Superiore (Messina). [**Ankylostomiasis in Faro Superiore (Messina)**] *Giorn. di Malattie Infettive e Parassit.* 1958, July, v. 10, No. 7, 526–7.

This is a preliminary report of an investigation into infection by *Ancylostoma duodenale* in the population of a small area near Messina. Part of the whole plain near the city is heavily infected as conditions are very suitable for the dissemination of the disease. The authors therefore decided to investigate a slightly more hilly area where conditions are not quite so suitable.

In the first test the faeces of 48 persons, 5 of whom were elementary schoolchildren, were examined by the flotation method. 14 were positive, including 3 of the 5 schoolchildren. All the persons had been selected because they showed intestinal symptoms or severe anaemia. A further test was then performed on 159 schoolchildren—the whole school population. 73 were negative to all helminths, 2 were positive for *A. duodenale*, and no less than 26 positive for *Hymenolepis nana*.

The authors summarize their results as follows: 213 persons were examined and 22 were found positive for *A. duodenale* [it is not clear how the figures are arrived at]. All infected persons were treated with a chenopodium oil–tetrachlorethylene compound [dosage not given], and

on re-examination 1 month later the majority were negative. A few months later some of the negative persons had again become positive.

Since the particular area is small the authors recommend treating the soil at the same time as the infected persons.

[No explanation of the high *Hymenolepis* rate is given.]

W. K. Dunscombe

Yamaguchi, T., Nishimoto, M., Sakamoto, Y., Higashikawa, H. & Irie, T. [**On the Distribution of Hookworm in Susaki City, Kochi Prefecture**] *Shikoku Acta Med.* 1958, May, v. 12, No. 5, 786–90. [In Japanese.]

The English summary appended to the paper is as follows:—

"In 21 to 23 February 1958, the studies on distribution of hookworm were carried out in Susaki City, Kochi Prefecture and the following results were obtained.

"1) Feces were examined by smear method and out of 472 persons examined 50 or 10·6% were infected with hookworm.

"2) By the treatment with tetrachlorethylene of 45 infected persons, 26 discharged hookworm and 4 or 15·4% were infected with *Ancylostoma duodenale*, 19 or 73·1% were with *Necator americanus* and 3 or 11·5% were with both species.

"3) A total of 393 specimens of hookworm were studied and 20 were *A. duodenale*, 373 were *N. americanus*.

"4) The 148 worms of *N. americanus* demonstrated in one case, the most numerous infection."

Wei, Ping-Hsing & Kuo, Nien-Kung. **Intradermal Reaction in Ancylostomiasis.** *Chinese Med. J.* Peking. 1958, June, v. 76, No. 6, 556–60.

In a mass anti-ankylostomiasis campaign at present being carried out in China, the possibility of using intradermal tests in mass diagnosis was investigated.

Antigen was prepared by pancreatin digestion or by cold extraction, the latter method being simpler and producing a highly specific antigen [details can be found in the original]. The tests were tried on some 60 patients, and pseudo-positive and pseudo-negative reactions occurred in a small number of those infected and those used as controls.

The authors conclude:

"We do not deny that it is far from ideal, because it is but an indirect method, and its reliability is not yet 100 per cent and the intensity of infection cannot be determined by it. But still, since it saves time and its specificity is relatively high, it can be employed in the diagnosis of hookworm infection, especially in epidemiologic surveys."

W. E. Kershaw

MACKERRAS, M. Josephine. **The Decline of Filariasis in Queensland.** *Med. J. Australia.* 1958, May 24, v. 1, No. 21, 702–4. [17 refs.]

Periodic *Wuchereria bancrofti* infection was common in Queensland 50 years ago. It appears to have been essentially an urban disease, developing in and spreading from areas of white settlement. After 1910 the disease began to decline. Between 1937 and 1956 only 37 filariasis patients, all with late manifestations, were treated at Brisbane hospital.

Examination of night bloods from 1,094 persons in 19 settlements between 1949 and 1956 revealed only 2 asymptomatic carriers, both from the Torres Straits Islands. 1 case of acute filariasis was diagnosed in 1956, but in a consequent survey in 1957 no infections were found in 758 thorough examinations of night blood samples.

The decline is not due to treatment. *Culex fatigans* is still abundant in many districts, but domestic breeding places have been cleaned up considerably, and in some areas an allied species, *C. pipiens australicus*, is replacing *C. fatigans*. Also the use of mosquito nets has increased. It is thought that interplay of these and perhaps other factors caused transmission to decline below the maintenance level.

The literature on filariasis in Queensland is reviewed. *B. B. Waddy*

BUCKLEY, J. J. C. **Tropical Pulmonary Eosinophilia in relation to Filarial Infections (*Wuchereria* spp.) of Animals. Preliminary Note.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, July, v. 52, No. 4, 335–6, 1 chart.

Professor Buckley has succinctly and briefly described an experiment on a volunteer designed to reinforce the work of DANARAJ and his colleagues in Singapore [this *Bulletin*, 1957, v. 54, 490, 1341] on the filarial origin of this puzzling syndrome. Strong evidence was obtained that it is, in reality, a form of visceral larva migrans. He started on the basis that treatment with diethylcarbamazine had proved effective and that the filarial complement-fixation tests gave strongly positive reactions in all cases studied. Danaraj had suggested, in view of absence of microfilariae from the blood in patients with tropical eosinophilia, together with the positive complement fixation plus the curative effect of diethylcarbamazine, that the disease might be caused by exposure to infection with filarial parasites of animal origin for which man constitutes an unsuitable host and therefore in him full development cannot take place.

This suggestion has received considerable support from the two experiments, which are illustrated by a graph giving details of symptoms, eosinophil blood counts and filarial complement-fixation tests, extending over a period from June 1955 to December 1957. The object was to determine, if possible, whether the *Wuchereria* species, known to occur in wild and domesticated animals in Malaya [*ibid.*, 1956, v. 53, 349, 1156], could be transmitted to man, and by this means to shed light on

the problem of the possibility of these animals constituting a reservoir of infection in endemic areas.

From this aspect the experiments must be considered inconclusive. Inoculation with infective larvae was effected with those obtained from mosquitoes (*Mansonioides longiformis*) which had been fed on a monkey naturally infected with *Wuchereria* sp. (*malayi*?) and it failed to produce a mature infection (no microfilariae appeared in the blood during the subsequent 15 months). Furthermore, inoculation with infective larvae from mosquitoes which had been fed on a domestic cat carrying a natural infection with another Malayan species of *Wuchereria* (*W. pahangi* Buckley and Edeson) [*loc. cit.*] also gave a negative result, but in this instance the illness produced was terminated by diethylcarbamazine.

From the clinical aspect the results are even more suggestive. The appearance of most of the generally accepted signs and symptoms of pulmonary eosinophilia some time after each inoculation (14 and 10 weeks, respectively) may point to cause and effect. In each case the "cause" was a filarial parasite of animal origin and, in this respect also, the experiments supported Danaraj's hypothesis of the true aetiology of tropical eosinophilia. *Philip Manson-Bahr*

Laird, M. **Avian Microfilariae, *Wuchereria* Vectors and New Caledonia.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, May, v. 52, No. 3, 291–3.

Thin blood-films made from heart blood of 6 different species of birds from 4 different localities in New Caledonia, were examined for microfilariae and 4 of the 6 kinds of birds were found positive. These were the fantail warbler, the rufous-bellied whistler, the silver-eared honeyeater and the grey-backed silvereye. 1 sacred kingfisher and 1 Melanesian greybird were negative. Of the total 35 birds examined 18 or 51% were infected. 3 different species of microfilariae were recorded.

Knowledge of the intermediate hosts of avian filariids is very scanty but the author rightly points out that vectors of *Wuchereria* could possibly be involved and hence that field studies of infections in them might lead to confusion [see also this *Bulletin*, 1958, v. 55, 794].

J. J. C. Buckley

Thomas, T. C. E. **The Incidence of the Microfilariae of *Acanthocheilonema perstans* in the Population of Sierra Leone.** *Ann. Trop. Med. & Parasit.* 1958, Mar., v. 52, No. 1, 1–4.

"1. The results are recorded of the examination of blood films taken from the inhabitants of the Colony of Sierra Leone for the presence of the microfilariae of *Acanthocheilonema perstans*.

"2. The incidence of *A. perstans* in the population of the Colony was found to be similar to that reported by previous observers [this *Bulletin*, 1931, v. 28, 756].

" 3. An inverse association was found between the incidence of the infection in prisoners in Freetown prison and their length of residence in prison, but its explanation is very doubtful."

DUKE, B. O. L. **The Intake of the Microfilariae of *Acanthocheilonema streptocerca* by *Culicoides milnei*, with some Observations on the Potentialities of the Fly as a Vector.** *Ann. Trop. Med. & Parasit.* 1958, July, v. 52, No. 2, 123–8.

It is generally recognized that *Culicoides grahami* is an efficient vector of *Dipetalonema streptocerca* [this *Bulletin*, 1950, v. 47, 65] and *C. milnei* of *D. perstans* [*ibid.*, 1953, v. 50, 1069; 1956, v. 53, 910]; in contrast, very little is known of the ability of *C. milnei* to take in the microfilariae of *D. streptocerca* or to support their development to the infective forms. The author, when working in the British Cameroons, found it impossible to find a volunteer densely infected with the microfilariae of *D. streptocerca*, but free from those of *D. perstans* (although at a later date, he found such cases at Tafo in Ghana) and he therefore used a volunteer having " a heavy skin infestation with *D. streptocerca* and a minimal number of *D. perstans* microfilariae in the blood ". " Wild " flies were used in the experiment since a previous survey had shown that only one out of 1,266 dissected showed the presence of a filarial infection.

505 *C. milnei* and 266 *C. grahami* were fed on the volunteer on an area of skin rich in the microfilariae of *D. streptocerca*, and the subsequent dissections showed that the *C. milnei* group had taken up (comparatively) less than one-tenth of the number taken up by the *C. grahami* group. It was further shown that a group of 222 *C. milnei* fed on an area free from *streptocerca* took in a total of 5 microfilariae of *D. perstans*, while 505 flies fed on a *streptocerca* area took in a total of 9, these figures corresponding to the expected intake as based on the concentration of the microfilariae in the peripheral circulation.

As regards the development of *D. streptocerca* in *C. milnei* the author writes " Although more flies became infected in the group fed on the *streptocerca* area (11 parasites in five flies out of 224 dissected) than in the group fed on the *streptocerca*-free area (one parasite in one fly out of 167 dissected), the numerical difference between the two groups, which might appear suggestive of a higher incidence of larval development associated with the additional intake of microfilariae of *A. streptocerca*, is not statistically significant ". *R. M. Gordon*

SCOTT, J. A., MACDONALD, Etta M. & OLSON, L. J. **Susceptibility and Acquired Immunity of Two Subspecies of Cotton Rats to their Respective Strains of Filarial Worm Parasites.** *Exper. Parasit.* New York. 1958, July, v. 7, No. 4, 418–27.

Macdonald, Etta M. & Scott, J. A. **The Persistence of Acquired Immunity to the Filarial Worm of the Cotton Rat.** *Amer. J. Trop. Med. & Hyg.* 1958, July, v. 7, No. 4, 419–22.

"These experiments show that the retarding effect on growth and development of secondary infections of *Litomosoides carinii* in cotton rats, produced by a pre-existing primary infection, persists for 1 or 2 years after the introduction of the primary infection. It also persists for a considerable time after the death of the primary infecting worms. It is possible that this immunity, established at the time of introduction of the primary infection, persists for these long periods without reinforcement. On the other hand it seems possible, even in face of some evidence to the contrary, that the adult worms and, later, the deposits of dead worm tissue, may continue to exert an antigenic effect. Postmunition is suggested as a term which might be appropriate in a situation such as this."

O'Brien, W.; Hutton, P. W. **Symposium on Onchocerciasis.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, v. 52, No. 4, 390–91.

These 2 short letters relate to a recent symposium on onchocerciasis [this *Bulletin*, 1958, v. 55, 925].

i. Colonel O'Brien refers to Woodruff's observation on the low incidence of eye involvement in the rainy area of Calabar, compared with the dusty areas of Northern Ghana and Northern Nigeria where onchocercal eye lesions are common. This high infection rate in Northern Ghanians was confirmed in a recent survey of the Ghana Army: but a high incidence of infection was also found in Southern Ghanians from the hilly tropical forest area stretching from the lower Volta to Ashanti. Figures for the results of routine skin-snips are given and show that in groups of 20 to 33 men, each in 6 areas of Southern Ghana, the percentage of positive findings was from 48 to 68. The chief interest of these results is in the fact that eye lesions are not reported from these areas. In addition to the difference in rainfall, this part of Ghana has a much higher standard of nutrition than has the northern area.

ii. Dr. Hutton, from Uganda, considers that diethylcarbamazine alone is not curative and in his experience its sole use has always been followed by relapse. He adds that the marked reaction which accompanies diethylcarbamazine treatment may be controlled by prednisone: in this respect the antihistamine drugs "are virtually useless". Hutton believes that East African experience with suramin suggests that, unlike tryparsamide, it does not produce optic atrophy: but it should be given with caution initially, starting with 0·25 gm. doses and increasing the dose gradually to avoid allergic reaction. The urine should be watched for albumin during treatment. He thinks that, properly handled, suramin is a safe drug.

He confirms RAPER's observation that the syndrome of endocrine defect described is a very real one and is sufficiently common in areas of onchocercal hyperendemicity in Uganda, and not elsewhere, to convince one that there is a causal relationship. *H. J. O'D. Burke-Gaffney*

NELSON, G. S. **Onchocerciasis in the West Nile District of Uganda.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, July, v. 52, No. 4, 368–76. [15 refs.]

West Nile is situated in the north-west corner of Uganda, with the Nile-Congo watershed, between 4,000 and 5,000 feet, forming its western and southern borders, and the Albert Nile its eastern border. It is an ideal habitat for *Simulium neavei*. Stained skin-snip smears were prepared as described by NELSON [this *Bulletin*, 1956, v. 53, 783]. More than 3,000 *Onchocerca volvulus* positives were seen. 12 smears contained *Dipetalonema perstans*. *Wuchereria bancrofti* was common in lowland areas. *Loa loa* and *D. streptocerca* were not seen. Skin snips were taken from 9 different areas in each of 60 patients. Concentration of microfilariae was found to be greatest in the thighs and nearly 90% of nodules were around the pelvis. Head nodules were found only twice in more than 1,000 cases.

In the worst affected villages in the Nyara valley, all persons over 6 years of age were infected. Nevertheless out of 12 blind people in a population of 1,275, in only 2 instances was blindness thought to be due to onchocerciasis. Only anterior segment eye lesions were seen. Evidence of malnutrition was seen only in small children. Onchocercal dermatitis was common and severe, and the misery caused by this condition is stressed.

Skin lesions were more extensive in upper age-groups, and advanced lesions were commoner in women. Microfilarial counts were higher in hypertrophic skins than in the late form, mixed hypertrophic and atrophic lesions extending over most of the body surface. Enlarged inguinal and femoral glands, sometimes actually pedunculated, were found in most patients, and are regarded as a complication of onchocerciasis [this *Bulletin*, 1958, v. 55, 1148]. 7 tables give much information with clarity.

B. B. Waddy

NELSON, G. S. **Staining of Filarial Larvae in Insects before Dissection.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 1, 204.

The author, in Kenya, has developed a simple technique for demonstrating filarial larvae in preserved mosquitoes. It is a modification of that used by LEBIED (*Une nouvelle théorie endémiologique* (privately published), Imprimerie Darantière, Dijon) for studying filarial larvae in *Simulium damnosum*. It has the advantage that insect vectors need not be dissected on the spot and more accurate observations can be made on

density of infection, stage of development and species of the infective larvae.

The killed mosquitoes are placed at once in 80% ethyl alcohol where they may be kept indefinitely. The specimens are taken through descending dilutions of alcohol to distilled water, stained at room temperature for 3 days in Mayer's acid haemalum and differentiated in distilled water for 3 days. They are then transferred to pure glycerol, while awaiting dissection. 3-inch × 1-inch tubes are used, with 100–200 mosquitoes per tube.

Dissection is carried out with fine needles in reflected light and 35 × magnification of a stereomicroscope. All stages of larvae can be stained and readily detected and permanent mounts may be made in glycerol. In recently engorged mosquitoes, the blood meal becomes fixed and microfilariae cannot be detected in the stomach. More care is needed in handling third-stage larvae than in the case of fresh dissections. The author has dissected several thousand mosquitoes by this method and he collected several species of filarial larvae.

The technique is also useful in the study of onchocerciasis: in a collection of 454 *Simulium neavei* sent from Uganda in 80% alcohol 56 were found to be infected and 2 separate species of third-stage larvae were seen. *H. J. O'D. Burke-Gaffney*

McMahon, J. P., Highton, R. B. & Goiny, H. **The Eradication of *Simulium neavei* from Kenya.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 1, 75–107, 3 figs. [18 refs.]

There are two main areas of *Simulium*-borne onchocerciasis in Kenya, as follows: in north Nyanza an area of about 2,000 sq. miles, described as the Kakamega-Kaimosi zone; in south Nyanza, a group of two small and one large areas, Riana (16 sq. miles), Kodera (65 sq. miles) and the Kisii-Kericho zone (1,150 sq. miles). There have been two earlier campaigns against the *Simulium*. In 1943, Buckley [this *Bulletin*, 1952, v. 49, 709] introduced bush clearing in the small Riana focus. This successfully eradicated the fly, but would not be feasible for a large infested zone. In 1946, Garnham and McMahon [*ibid.*, 1947, v. 44, 1084; *ibid.*, 1954, v. 51, 821] exterminated *Simulium* in the Kodera focus by DDT treatment of streams. The present paper describes extension of the DDT larvicidal method to the two remaining very large foci.

The first attempt on the Kakamega-Kaimosi zone was made in 1947, but failed, largely owing to ignorance of the breeding sites of the larvae at that time. In Kenya, onchocerciasis is transmitted by *S. neavei* whose larval stages were first found in 1950 to be carried on freshwater crabs [*ibid.*, 1952, v. 49, 73]. This greatly assisted subsequent survey work which could then be based on larvae as well as adults. The methods used are described in detail; they were applied to some 15,000 sq. miles of Nyanza province, by teams of Africans led by European field officers.

The inclusive costs (adjusted to 1957 values) averaged about 7/– per sq. mile. Eradication was based on 7 to 9 treatments of DDT at 10- to 14-day intervals, the 9-cycle plan being recommended. Application of DDT emulsion to the streams and rivers was carried out in the usual way to give a final concentration of 0·5 to 1 p.p.m. The work was planned carefully so as to cover an entire area within the period of the treatment cycle. All treatments were checked by a special team searching constantly for crabs bearing live larvae. The south Nyanza foci were treated in 1953 and the northern zone in 1954. No *Simulium* have been found since then except for some catches in one area in December 1955. This was rapidly re-treated, and no more flies have been discovered since then. The cost of the campaigns (also at 1957 values) averaged £1·64 to £1·92 per sq. mile; or £0·65 to £1·39, excluding recurrent expenditure on wages of permanent staff, etc. *J. R. Busvine*

James, T. **The Single-Dose Treatment of Oxyuriasis with Promethazine Hydrochloride: a Cautionary Tale.** *South African Med. J.* 1958, July 5, v. 32, No. 27, 689–90.

Promethazine has antihistaminic properties, it antagonizes adrenaline, is a hypnotic and suppresses vomiting. To attain these effects, the dosage recommended for an adult is 15–25 mgm. per day in one dose; for a child the same amount may be prescribed in divided doses.

The same drug has been employed in the United States for the treatment of threadworm infection, in a single dose of 125 mgm., administered at bedtime, to patients of any age [see Avery, this *Bulletin*, 1956, v. 53, 1471]. The author administered this dose of the drug to 2 female children aged 4 and 6 years respectively. 3 hours later the younger child was noted to be restless and in delirium; 2 hours later movements were grossly ataxic and incoordinated. Terror and amusement appeared to seize her alternately, she was completely disorientated and was unable to recognize her parents. She later vomited twice, became quieter and was in a deep sleep 12 hours after the time of administration. The elder child began to manifest an identical train of symptoms 8 hours after taking the drug and was restless and wildly hallucinated 3 hours later, after which she too fell into a deep sleep. Both children slept for 12 hours and awoke with ravenous appetites.

Despite this alarming experience, the father of the children volunteered to take a similar dose. He was a big man, aged 35 years, weighing over 200 lb. He awoke from a sleep in an aggressive state of delirium and was vicious and destructive. This continued for several hours, when he again fell into a deep sleep, from which he awoke with vague, unpleasant memories and great hunger.

[Promethazine hydrochloride in a single dose of 125 mgm. does not seem an ideal treatment for oxyuriasis, however effectively it may eliminate the parasite.] *J. H. Walters*

Kozar, Z., Kolloto, Barbara & Warda, L. Untersuchungen über die Trichinellose mittels des Intradermaltestes. I. Bewertung des Intradermaltestes bei frischen und älteren Infektionen. [**Investigations on Trichinosis with the Help of the Intradermal Test. I. The Significance of the Intradermal Test in Fresh and Old Infections**] *Zent. f. Bakt.* I. Abt. Orig. 1958, v. 172, Nos. 1/2, 164–74. [32 refs.] II. Epidemiologische Untersuchungen im Gebiete von Bialystok. [**II. Epidemiological Investigations in the Area of Bialystok**] *Ibid.*, 175–83. [29 refs.]

I. The intradermal test (IDT) in trichiniasis has been known since 1928. Since then various opinions have been expressed regarding its value, but up to the present it is generally admitted that it represents the most reliable test for diagnosis of fresh and old infections with *Trichinella*. The doubts which have been expressed are attributable to variation in experimental material, different qualities of the antigen and varying values of the results. Usually the test becomes positive 16–17 days after infection, but great discrepancies occur. For the antigen, most authorities follow Bachman's method [this *Bulletin*, 1928, v. 25, 470] which is an extract of the cleansed larvae in Coca's fluid.

The results here discussed are the outcome of 11 years' trial of immunological diagnosis of trichiniasis by IDT. Most of the observations are based upon a large epidemic in the neighbourhood of Gdansk in 1952. The antigen employed for the most part was prepared from *Trichinella spiralis* larvae from an artificially-infected pig, though a small proportion was derived from infected rats. The lyophilized substance was preserved for many months, and even as long as one year, in a refrigerator and diluted with saline shortly before use. The antigen was diluted up to 1 in 10,000; 0·1 ml. of this was injected intradermally and as a control the same amount of control fluid. The reaction was assessed after the first 30 minutes; and sometimes after 1 or even as long as 24 hours.

Two groups of people were studied in the test. The first consisted of 180 persons in an epidemic in Bydgoszcz. Unfortunately the time and source of infection were unknown. The first tests were performed 7 to 28 days after the beginning of illness and in 40 patients it was repeated after a further 8 days.

A second group consisted of 99 healthy persons, all of whom had previously suffered from trichiniasis. The onset of their illnesses dated from 6 months up to 20 years previously. In 63 of them symptoms of trichiniasis had been serious. In the remainder it had been asymptomatic.

Immediately after injection of the antigen and the control a weal formed from 5–8 mm. in diameter. In negative cases the fluid was reabsorbed after a few minutes, but in the positive the weal increased in size and often exceeded 15 mm. or more within 15–20 minutes. Pseudopodial extensions were seldom seen and a surrounding rim of erythema sometimes formed which measured in some instances 45–50 mm. The

reaction, showing a white centre with red margins, persisted for 30 minutes, but usually disappeared after one hour.

The area must be inspected the following day, for delayed reactions may appear which take the form of an irregular, but almost always inflamed, induration. This reaction may reach its zenith after 18 hours, but it regresses after 24.

Out of 180 patients positive reactions were recorded in 71·6%. This proportion shows the value of the test.

The following conclusions can be drawn. The later the test is performed subsequent to the illness, the higher are the results. From calculations it appears that an interval of 38 days from the time of the infection is required for sensitivity to develop. The intensity of the infection most certainly has an influence upon the time of the reaction and the length of its persistence. Early and delayed reactions are specific for trichiniasis. The test makes it possible to detect old infections and to estimate the time which has elapsed since onset.

II. Bialystok lies on the most northerly boundary of Poland and in a region where the incidence of trichiniasis is at its highest. In slaughtered swine it is as high as 0·226% and this figure agrees on the whole with statistics from neighbouring Soviet territories. It was suspected that infection might result from the presence of some hitherto unknown wild animal reservoir.

The IDT method of identification was employed. In this region the majority of the inhabitants are engaged in agriculture and live on pork for the most part, while in summer time the pigs wander in the woods where they come into contact with wild game. Within the space of 3 months 2,472 persons were investigated of whom 37·94% were positive. This is a high figure, but Evans in Cleveland, Ohio [*Bull. Hyg.*, 1939, v. 14, 336], found 36%, a finding which was corroborated by overall dissection of the diaphragm and other musculatures. The average percentage in the United States is about 16%.

It is therefore certain that in the Bialystok region trichiniasis is hyperendemic, the majority of those infected being asymptomatic, and that as the result of long-standing infection an immunity to trichiniasis has been established; possibly also the danger of wholesale infection is minimized by the thorough cooking of pork.

These findings were confirmed by a more minute examination at 344 autopsies in which 15% were found infected. No differences in sex incidence was disclosed but the highest figures recorded were in the decade 31–40.

By the intradermal test considerable variation in incidence in various localities was revealed as might have been expected. The range was considerable—from 2% to 100% in different villages.

This method allows a quick assay of the epidemiology of trichiniasis to be made. However, no direct relationship with the presence of those primeval forests for which this area is famous could be established. The

two famous and extensive forests lie in the district of Hajnowka and Augustow. The first of these has a medium infection; in the second it is minimal. *Philip Manson-Bahr*

DEFICIENCY DISEASES

See also p. 801, Thonnard-Neumann, Klinische Beobachtungen zu Klima und Ernährung in Kolumbien. [**Clinical Observations on Climate and Nutrition in Colombia**]

Janz, A. J., Demayer, E. M. & Close, J. Nutrition et lactation chez la femme. Production quantitative et qualitative du lait avec considération particulière des pays sous-développés ou à ressources alimentaires insuffisantes. [**Nutrition and Lactation in Women. The Quantity and Quality of Milk Production with Special Consideration of Under-Developed Countries where Food Resources are Insufficient**] Reprinted from *Ann. Nutrition et Alimentation*. 1957. v. 11. Nos. 3/4, A33–A81. [227 refs.]

This is a thorough review of the literature of human lactation. Existing knowledge of the quantity and chemical composition of human milk produced under various circumstances has been abstracted and clearly arranged. Work in all 5 continents, much of which appears in journals not readily accessible, is recorded. This review can be strongly recommended to anyone seeking detailed information about any aspect of human milk. It is a most valuable contribution to the literature of nutrition. *R. Passmore*

Turek, B. Pelagra v severní Koreji. (Klinická studie dvou případů sekundární pelagry.) [**Clinical Study of Two Cases of Secondary Pellagra in North Korea**] *Časopis Lékařů Českých*. Prague. 1958, Aug. 29, v. 97, No. 35, 1092–5, 3 figs. [18 refs.]

The English summary appended to the paper is as follows:—

"The author describes two cases of secondary pellagra observed in 1956 in the Czechoslovak Red Cross Hospital in Korea. The primary disease which led to impaired absorption and to pellagra was, in one patient amoebic dysentery, in the second patient advanced cancer of the stomach.

"These two observations were the only cases of pellagra among 40.000 out-patients at the internal and dermatological department of the hospital. This justifies the conclusion that pellagra is a rare and sporadic

disease in those regions, though dietary and climatic conditions are such that a more frequent incidence of the disease could be assumed. The discrepancy between the rare incidence of pellagra and the conditions leading to its development are explained by Gillman's concept of the disease as a manifestation of chronic malnutrition of a certain type. According to this concept the nutritional deficiencies of the inhabitants of the Far East, where rice and millet are the staple foods do not incline to the development of pellagra."

Govil, K. K. & Prasad, B. G. **A Note on some Feeding Trials with Food Yeast in Uttar Pradesh.** *J. Indian Med. Ass.* 1958, June 16, v. 30, No. 12, 400–401.

"Consumers' feeding trials with food yeast lasted for about three months at Thana in 38 families including 125 persons, and four months at Indaurabagh in 24 families with 57 persons. The acceptability was 75·3 per cent. in the former and 76 per cent. in the latter.

"½ oz. of food-yeast mixed in *atta*, *dal* or curried vegetables was consumed daily by a person without untoward effects."

Manchanda, S. S. & Gupta, H. L. **Malnutrition in the Punjab—with particular reference to Protein Deficiency. (A Review of 200 Cases.)** *Indian J. Child Health.* 1958, June, v. 7, No. 6, 386–95, 13 figs. [13 refs.]

200 children were admitted during the course of 2 years to the children's ward of a hospital in Amritsar. A miscellaneous assortment of diseases were found. Oedema was present in 67 children: many of these were subsisting on poor cereal diets without milk: serum protein levels were low and gastro-enteritis common. The oedema was probably attributable in most cases to protein malnutrition. In 30 children there was gross undernutrition (25% or more below standard weight). There were 9 children with rickets, 7 with scurvy and 4 with keratomalacia. This paper shows that unfortunately there is every opportunity to study the classical deficiency diseases in Amritsar. *R. Passmore*

Leitner, Z. A. **Postoperative Malabsorption. Secondary Protein Malnutrition Syndrome.** *Lancet.* 1958, Sept. 6, 504–7, 3 figs. [32 refs.]

"Two patients are reported who developed a syndrome of protein malnutrition, hitherto undescribed, some years after pancreaticoduodenectomy.

"The possible mechanism of the malabsorption leading to secondary protein malnutrition is discussed."

Schyns, C. & Demaeyer, E. M. Recherches electrocardiographiques dans le Kwashiorkor. [**Electrocardiographic Studies in Kwashiorkor**] Reprinted from *Acta Cardiologica.* 1957, v. 12, No. 4, 413–36, 4 figs. [12 refs.]

This paper records analyses of 41 electrocardiograms in 25 children (6 controls and 19 patients). The electrocardiogram may be normal in kwashiorkor, but the voltage is usually reduced and sometimes markedly so. Alterations of the T-waves are also frequent, as is bradycardia. These alterations are reversible by treatment.

Simultaneous measurements of levels of serum protein were also made. There appears to be some relationship between low levels of serum protein and abnormal electrocardiograms, but they are not closely associated. [Levels of potassium in the serum were not measured: this might have indicated something of the clinical significance of the electrocardiographic changes.] *R. Passmore*

Pretorius, P. J., Retief, F. J. P. & Wiechers, S. G. **Dried Skimmed Milks and Kwashiorkor.** *South African Med. J.* 1958, May 31, v. 32, No. 22, 563–5. [17 refs.]

This paper records a thorough comparison of roller-dried skimmed milk, spray-dried skimmed milk and spray-dried acidified skimmed milk in the treatment of kwashiorkor. Groups of 20 children were treated with the same régime except for the three different milks. The clinical improvement was carefully assessed and the weekly rise in serum albumin measured. Similar and satisfactory results were obtained with all three milks.

The result is important because the roller process of drying is cheaper than spray-drying which has a high installation cost. In a previous experiment there was a suggestion that spray-dried milk imported into S. Africa was more effective than roller dried milk [this *Bulletin*, 1956, v. 53, 1374]. *R. Passmore*

Sidransky, H. & Farber, E. **Chemical Pathology of Acute Amino Acid Deficiencies. I. Morphologic Changes in Immature Rats fed Threonine-, Methionine-, or Histidine-Devoid Diets.** *Arch. Pathology.* 1958, Aug., v. 66, No. 2, 119–34, 22 figs. [39 refs.] **II. Biochemical Changes in Rats fed Threonine- or Methionine-Devoid Diets** [with the technical assistance of Mary A. Anderson]. *Ibid.*, 135–49. [34 refs.]

van Dam-Bakker, Anna W. I., de Groot, A. P. & Luyken, R. **The Influence of Alternate High-Protein and Low-Protein Feeding on Growth and Reproduction and on Regeneration of Haemoglobin in Rats.** *Brit. J. Nutrition.* 1958, v. 12, No. 3, 259–66. [10 refs.]

SPRUE

HUNTER, F. M. & PREVATT, A. L. **Diagnostic Methods in Intestinal Malabsorption.** *Amer. J. Med. Sci.* 1958, July, v. 236, No. 1, 81–100. [162 refs.]

HAZARI, O. K. & WOODRUFF, A. W. **Prognosis of Tropical Sprue.** *Brit. Med. J.* 1958, Aug. 9, 344–5. [10 refs.]

These authors aver that there still exists doubt regarding the prognosis of tropical sprue. The reason for apparent divergence of views may lie in the fact that different types of cases have been followed up; those with a poor prognosis have really been patients affected with idiopathic steatorrhoea, while those with a satisfactory outcome have been suffering from tropical sprue.

WOODRUFF in 1949 [this *Bulletin*, 1949, v. 46, 965] carried out a study in which patients invalided from India to Britain were followed for 2¾–3 years. Of the 47 patients treated in 1949 it had been possible to follow up 34. Now 17 have been traced after a 10-year interval. All were able to carry on their full work: in 9 it was sedentary; moderately heavy in 4; while in a similar number it was classified as heavy manual. 15 had gained in weight, while the remaining 2 had lost just 1½ lb. Apart from occasional limited attacks of diarrhoea all stated that they passed normal, inoffensive stools. 3 had experienced some glossal ulceration. 2 had one or more ulcers for 2–10 days associated with attacks of diarrhoea. 2 complained of minor degrees of abdominal discomfort, distension and flatulence, while a third stated that these had occurred only after eating fried food.

If it is accepted that these 17 patients are representative of the whole series then the long-term prognosis of tropical sprue is good, and after treatment with high-protein and low-fat diet, a patient may be expected to be restored to full health.

Woodruff reverts to his views first expressed in 1952 [this *Bulletin*, 1953, v. 50, 329] that so-called tropical sprue in the Caribbean is possibly nutritional megaloblastic anaemia with which alimentary symptoms may be associated and may become a source of confusion. The chronicity of idiopathic steatorrhoea and its failure to be permanently influenced by treatment afford a valuable means of differentiating between tropical sprue and idiopathic steatorrhoea, and the difference in their course suggests that they are separate aetiological entities.

Philip Manson-Bahr

HAEMATOLOGY

Dutta-Chaudhuri, R. & Chaudhuri, B. **A Simultaneous Study of Bone Marrow of Newborn Babies and their Severely Anaemic Mothers.** *J. Trop. Pediatrics.* London. 1958, Sept., v. 4, No. 2, 71–4. [11 refs.]

The bone marrows of 30 Indian, mainly Bengali, newborn babies were studied together with those of their mothers. 21 of the mothers were anaemic; 9 suffered from iron deficiency, 7 from nutritional macrocytic anaemia, and 5 from dimorphic anaemia. [Different authors define dimorphic anaemia differently. In this instance the marrow is being described as showing macronormoblasts with non-haemoglobinized cytoplasm intermingled with a few micronormoblasts. There were also present metamyelocytes, giant stab cells, and a few macropolycytes. Presumably the micronormoblasts and the failure to achieve haemoglobinization in some macronormoblasts are taken to indicate an iron deficiency, and the abnormalities of white cell development are—following Foy and Kondi—accepted as evidence of deficiency in maturation factors also affecting the red cells.] The abnormalities found in the mothers were noted in a lesser degree in their infants. The authors suggest that their findings support the use of haematinics in early infancy in children born to anaemic mothers. *H. Lehmann*

Smith, D. A. & Weiss, C. **Bone Marrow Studies in the Sudan.** *J. Trop. Med. & Hyg.* 1958, July, v. 61, No. 7, 161–7, 7 figs. [21 refs.]

In the course of a survey for kala azar the authors have examined a considerable number of bone marrow smears from Sudanese. They included 114 men and 19 women with kala azar, 11 men and 12 women with other protozoal diseases, and 55 normal controls. There was no correlation between the haemoglobin level and the degree of anaemia in kala azar. About half of the kala azar patients showed in the distribution of the red cell diameter a general shift in the direction of microcytosis and in addition a certain number of macrocytes, some with diameters above 10 μ. In such patients red cell precursors were seen in the bone marrow which seemed to be intermediate between normoblasts and megaloblasts. The authors describe 2 types: "small megaloblasts" which have all the morphological features of the megaloblasts except that they are smaller (14–16 μ), and "intermediate erythroblasts". These latter cells are either basophilic or orthochromatic, but the nuclear development seems to lag behind in the haemoglobinization of the cytoplasm. The description "erythroblast" has been chosen deliberately rather than "intermediate megaloblast" to avoid the implication that

these abnormal forms are necessarily related to the abnormal megaloblast series.

The authors incline to the view that the anaemia in kala azar is due to an excessive blood destruction in the grossly enlarged spleen. There was no obvious explanation for the presence of the intermediate erythroblasts. They could be seen in some patients with other protozoal infections and even, though in smaller numbers, in some normal persons. There was no relationship between these cells and dietary deficiency. It remains still possible that such an explanation might apply, but in that case it would have to be conditioned by an irritative hyperactivity rather than by a straightforward nutritional deficiency. *H. Lehmann*

Govil, K. K. & Pant, K. C. **Haemoglobin Values of School Boys in Uttar Pradesh.** *J. Indian Med. Ass.* 1958, July 16, v. 31, No. 2, 65–7.

"In a survey of 931 school boys in Uttar Pradesh the haemoglobin curve showed, generally, a gradual increase in the average haemoglobin values with the increase of age from about 13·91 g. at the age of six years to about 15·00 g. at nineteen years. The haemoglobin values of younger boys were lower than those accepted as normal for healthy adults. A distinct correlation of haemoglobin level with both weight and height was noticed. The haemoglobin figures were found satisfactory and were due to an adequate intake of iron in their diets."

Bessis, M. Étude au microscope électronique de la destinée d'une molécule dans l'organisme: la ferritine et le cycle hémoglobinique du fer. [**A Study with the Electron Microscope of the Fate of One Molecule in the Living Organism; Ferritin and the Incorporation of Iron into Haemoglobin**] *Bull. Acad. Nat. Méd.* 1958, v. 142, Nos. 23/24, 629–43, 10 figs. [13 refs.]

The electron microscope makes it possible to observe objects which are no larger than 15 Å. The author has thus studied the appearance of ferritin and haemosiderin in erythrocytes being digested by primitive reticulum cells of human bone marrow. In erythroblasts he was able to follow the fate of ferritin and evidence is brought forward which suggests that the mitochondria release the iron from ferritin and are also involved in the incorporation of the iron into haemoglobin. In thalassaemia and in similar conditions one finds a large quantity of unutilized iron in the mitochondria, and it seems that the disorder can be traced to an inability of these cellular structures to discharge their normal functions.

The article is illustrated with excellent photographs. *H. Lehmann*

Huisman, T. H. J., Martis, E. A. & Dozy, Andrée. **Chromatography of Hemoglobin Types on Carboxymethylcellulose.** *J. Lab. & Clin. Med.* 1958, Aug., v. 52, No. 2, 312–27, 12 figs. [26 refs.]

Shields, G. S., Lichtman, H. C., Messite, Jacqueline & Watson, R. Janet. **Studies in Sickle Cell Disease. I. Quantitative Aspects of Sickling in the Newborn Period.** *Pediatrics.* Springfield, Ill. 1958, Aug., v. 22, No. 2, 309–18, 8 figs. [21 refs.]

"In newborn infants with sickle cell trait, the percentage of erythrocytes capable of being sickled in vitro gradually rose during the first 4 months of life. A concomitant fall in the percentage of Hgb F was demonstrated. The percentage of cells which could be induced to assume the sickled shape was found not to be correlated with the percentage of Hgb S, but instead was correlated with the reciprocal of the concentration of Hgb F.

"The specific reaction rate of alkali resistant hemoglobin in the infants less than 3 months of age was found to differ from that found in adults and in infants more than 3 months of age."

Sharma, R. S., Parekh, J. G. & Shah, K. M. **Sickle Cell-Thalassaemia with Acute Myeloid Leukaemia—a Case Report.** *J. of J.J. Group Hosps. & Grant Med. College.* Bombay. 1958, July, v. 3, No. 3, 217–23, 4 figs.

Vullo, C. & Tunioli, A. M. **Survival Studies of Thalassemic Erythrocytes transfused into Donors, into Subjects with Thalassemia Minor and into Normal and Splenectomized Subjects.** *Blood.* 1958, Aug., v. 13, No. 8, 803–10, 5 figs.

"The analysis of the curves of thalassemic red cell survival studied in children suffering from thalassemia major, in subjects with thalassemia minor, in normal splenectomized subjects and in healthy persons shows:

"(a) thalassemic erythrocytes show a marked shortening of life span, with a wide range of half life from case to case;

"(b) thalassemic erythrocytes survive longer in patients with thalassemia major and minor than in normal subjects;

"(c) the behaviour of thalassemic erythrocyte survival curves in the anemic patients and in the normal splenectomized cases is almost similar. On the basis of these results, the authors emphasize that:

"(1) valuable data on the seriousness of the hemolytic process in thalassemia major can be drawn only from autotransfusion studies;

"(2) in both thalassemia major and minor the spleen has less hemolytic activity on thalassemic red cells than in normal subjects;

"(3) since survival curves between anemic and normal subjects differ principally in the initial component where the most abnormal red cells

are destroyed by the normal spleen, it is probable that the spleen of patients with thalassemia major is not so greatly active against these cells."

VAN DIJK, M. C. Twee gevallen van thalassemie met hemoglobine-E. [**Two Cases of Haemoglobin E Thalassaemia**] *Nederl. Tijdschr. v. Geneesk.* 1958, Aug. 16, v. 102, No. 33, 1597–9, 4 figs. English summary (5 lines).

Haemoglobin E–thalassaemia was seen in 2 Bandjarese children in Balikpapan, Indonesia. The condition is described in detail and laboratory findings as well as abnormal X-ray pictures of bones are included. The families were studied and in each case 1 of the parents was a haemoglobin E trait carrier and the other a carrier of the thalassaemia gene (thalassaemia minor). *H. Lehmann*

BRUMPT, L. C. & BRUMPT, V. Résistance au paludisme et hémoglobines anormales (en particulier hémoglobine E). [**Resistance against Malaria and the Abnormal Haemoglobins (especially Haemoglobin E)**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 217–24. [21 refs.]

A brief review is given of the relation between malaria and haemoglobins S, C, and F. The greater part of the paper deals with the differential distribution in Indo-China of haemoglobin E which coincides with a greater resistance against malaria. This resistance is particularly high in Indo-Chinese aboriginals and is greater in the Cambodians than in the other more recent populations of that area. The authors were able to examine 20 aboriginals who came to Phnom-Penh for treatment of leprosy. Of 10 Khas 5, and of 10 Phnongs 5 were heterozygous for the gene determining haemoglobin E, of the Phnongs a 6th was homozygous. In the Cambodians 32% of 1,000 investigated were either heterozygous or homozygous for the abnormal gene. The incidence was still higher in Cambodians coming from certain Vietnamese villages and was lower in Cambodians living in Paris. The latter would belong to the upper class and would possess more Chinese admixture. In Chinese, Vietnamese and Malayans no haemoglobin E was found.

[At the time of this investigation the authors were not yet aware of the existence of haemoglobin A_2. This haemoglobin present in small amounts in normal people may rise in proportion in thalassaemia and may then be recognized in routine paper electrophoresis of the haemoglobin. As haemoglobin A_2 has the same electrophoretic properties as haemoglobin E a thalassaemic may easily be mistaken for a haemoglobin E trait carrier when the incidence of haemoglobin E is determined in a population where thalassaemia is also present. This possible source of

error has been pointed out by Aksoy *et al.* (this *Bulletin*, 1957, v. 54, 1233). de Traverse *et al.* (*ibid.*, 1959, v. 56, Jan.) have reported at a session of the Société de Biologie in Paris on the 11th January, 1958, that family studies of Cambodians have shown that what had in some instances been taken to represent haemoglobin E was in fact a raised haemoglobin A_2 fraction in thalassaemia.]

H. Lehmann

Vella, F., Ager, J. A. M. & Lehmann, H. **An Abnormal Haemoglobin in a Chinese: Haemoglobin G.** [Correspondence.] *Nature.* 1958, Aug. 16, v. 182, 460–61, 1 fig. [11 refs.]

Ager, J. A. M., Lehmann, H. & Vella, F. **Haemoglobin "Norfolk": a New Haemoglobin found in an English Family with Observations on the naming of New Haemoglobin Variants.** *Brit. Med. J.* 1958, Aug. 30, 539–41, 3 figs. [21 refs.]

A new haemoglobin variant, the first in a native Briton, was noticed in the blood of one Englishman among 2,550 Britons examined in Malaya, and the same component was subsequently found in the blood of his father and younger brother in Norfolk. It formed about 27% of the total haemoglobin, and the affected subjects were otherwise haematologically normal. The new component had the following distinctive properties: (i) it moved faster than Hb J on paper electrophoresis at *p*H 8·6, but more slowly than N; (ii) it separated slightly from A on paper electrophoresis at *p*H 6·5 and *p*H 7 (which J does not); (iii) it separated from A on column chromatography in resin at *p*H 6 (which J does not). In spectrographic qualities, solubility, and alkali resistance it resembled Hb A.

The difficulties in classifying and naming new haemoglobin variants, previously mentioned by two of the authors [this *Bulletin*, 1958, v. 55, 936], are now considered more fully. Until a final solution descriptive of amino-acid sequence is reached in each case, the authors suggest that new haemoglobins should not be designated by letters (for the alphabet is nearly exhausted), but that the variant should be named provisionally, for example by a place-name, and allotted to a group according to its behaviour in the most commonly used method of separation, paper electrophoresis at *p*H 8·6. As a basis for discussion they propose the following groups for adult haemoglobins:—

Group I	or	"C group"—Present species	C, A'_2, E–A_2, O
„ II	or	"S group"— „ „	S–D and its variants
„ III	or	"G group"— „ „	L–P, G, Q
„ IV	or	"A group"— „ „	A–M
„ V	or	"J group"— „ „	K, J, "Norfolk", N
„ VI	or	"I group"— „ „	I–H

For further proposals regarding designation within groups, and for remarks on three foetal variants, the original paper should be consulted.

A. B. Raper

VENOMS AND ANTIVENENES

Schöttler, W. H. A. **Reference Toxins for Antivenin Standardization.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 2, 341–61, 5 figs. [18 refs.]

"Potency determinations in mice of venom samples from snakes of the species *Bothrops jararaca*, which had been caught in an area of less than 10,000 km², gave the following principal results:

"(1) Various methods of drying—i.e., closed and continuous vacuum-drying at 5° and 37°C and freeze-drying (lyophilization)—had no different effect on the potency of venoms.

"(2) Venom samples which display no differences in the final results of intravenous assay may be distinguishable if the observation time is limited to one or two hours.

"(3) Venom samples obtained from snakes caught no more than about 50 km apart may be of different potencies.

"(4) Different titres may be obtained for an antivenin, if different samples of venom from the same snake species are employed as reference preparations in the assay.

"From physiological experiments on dogs and rabbits, in conjunction with observations made in tests on mice, it is evident that *B. jararaca* venom causes death in circulatory collapse through a mechanism which is as yet unknown. Two physiologically (and probably immunologically) distinct hypotensory factors seem to be present in this venom.

"The conclusions drawn from the investigation is that consistent and reproducible reference preparations of snake venoms for antivenin assay can probably be obtained only from snakes that are bred and kept in captivity under constant environmental conditions."

Shulov, A., Weissmann, A. & Ginsburg, H. [**Observations on the Lyophilized Venom of the Egyptian Black Snake** *Walterinnesia aegyptia F. lataste*] *Harefuah.* Jerusalem. 1958, Aug. 1, v. 55, No. 3 [in Hebrew 54–7, 2 figs. & 2 charts. (13 refs.) English summary 57].

The English summary appended to the paper is as follows:—

"The fresh lyophilised venom of Walterinnesia aegyptia F. lataste was injected subcutaneously into white mice and the 50% mortality dose

was calculated and found to be $LD_{50} = 8{\cdot}2\ \gamma$. The venom is neurotoxic, and in comparison with the venoms of the other poisonous snakes of Israel was found to be the most potent venom so far investigated."

Calvo, R., Chionetti, I. J., Fasciolo, J. C., Binia, A., Puebla, M. M., Zangheri, E. & Fernandez, R. Mécanisme de l'action hypertensive du venin de *Lactrodectus mactans*. [**Mechanism of the Hypertensive Action of *Lactrodectus mactans* Venom**] *C.R. Soc. Biol.* 1958, v. 152, No. 1, 193–4.

TOXOPLASMOSIS

Nussenzweig, Ruth S. Toxoplasmose. Inquérito sorológico feito pela prova do corante em doadores de sangue. [**Serological Survey for Toxoplasmosis in Blood Donors by Means of the Dye Test**] *Gaz. Méd. Portuguesa.* 1958, Mar.–Apr., v. 11, No. 2, 243–7. [12 refs.]

The English summary appended to the paper is as follows:—

"The dye-test for the detection of *Toxoplasma* antibodies was performed in the serum of 370 blood-donors of the Hospital of the São Paulo University Medical School, in São Paulo, Brazil. A large proportion of positive results were obtained. More than 50 percent of the donors showed low antibody titers (1/16 and 1/64). In 17 percent the titers were higher and only about 30 percent of the tests were negative.

"In one of the donors a very high titer (1/16384) was obtained at the time he donated blood. It slowly decreased during the 18 month period of follow-up. Except for an amygdalitis at the time of the first test, the patient showed no clinical symptoms during the whole period of observation."

Hiraoka, T. **A Study of Toxoplasmosis. Report 2. Further Five Cases of Human Toxoplasmosis found in Western Japan.** *Kyushu J. Med. Sci.* Fukuoka. 1958, Feb., v. 9, No. 1, 22–37, 11 figs. [53 refs.]

See this *Bulletin*, 1957, v. 54, 1357.

Goldman, M., Carver, R. K. & Sulzer, A. L. **Reproduction of *Toxoplasma gondii* by Internal Budding.** *J. Parasitology.* 1958, Apr., v. 44, No. 2, 161–71, 45 figs. on 2 pls. & 1 text fig. [13 refs.]

It is generally assumed that *Toxoplasma gondii* multiplies by binary fission [this *Bulletin*, 1957, v. 54, 1236], but in this paper the authors describe a process of internal budding, which is revealed by special

techniques. First, the peritoneal exudate of infected mice is placed in 10 volumes of 0·1 or 1% formol saline, after which the suspension is centrifuged and smears are prepared from the sediment. While still moist they are fixed in Bouin's or Hollande's solution for 2 or more days, after which they are transferred to 70% alcohol for several hours. The smears are then bleached in $KMnO_4$ and stained by Honigberg and Davenport's silver-protein method [*Stain Technology*, 1954, v. 29, 241; this *Bulletin*, 1954, v. 51, (1301)].

The process of division—which is described in some detail—is as follows. On the anterior pole of the nucleus there appear 2 bud-like processes, which are, however, not connected with the nucleus, since the latter shows no signs of division. The daughter-cells grow anteriorly, until they appear as replicas of the parent cell, each with a nucleus similar to the parental one. While still attached to each other, the grown daughter-cells break out from the parent's cell, which is destroyed. When freed, the paired daughter-cells eventually separate, thus completing their development. In discussing the taxonomic implications of this method of reproduction, for which the term " endodyogeny " is proposed, the authors suggest that *Toxoplasma*, *Besnoitia* and *Sarcocystis* should be grouped together and separated from all other classes of Protozoa.

The paper is illustrated by photomicrographs and figures, as well as by a schematic drawing, which gives a clear picture of the process of division.

C. A. Hoare

Beverley, J. K. A. & Beattie, C. P. **Glandular Toxoplasmosis. A Survey of 30 Cases.** *Lancet*. 1958, Aug. 23, 379–84. [Numerous refs.]

This is a survey of acquired toxoplasmosis affecting mainly the lymph nodes; it is based on the experience of 30 patients from 4 of whom the parasite was isolated, while in the remainder the serology was positive. The clinical findings and the great variability of the condition are discussed. The lack of high fever is commented on, as is the differential diagnosis from glandular fever. The source of human toxoplasmosis whether from domestic animals, foodstuffs or direct human contact is inconclusively considered.

Details of all 30 patients are tabulated. *I. A. B. Cathie*

Thiermann I., Erica. Transmisión congénita del *Toxoplasma gondii* en ratas con infección leve. [**Congenital Transmission of** *Toxoplasma gondii* **in Rats with Latent Infection**] *Biológica*. Santiago. 1957, July, v. 23, 59–67. [22 refs.] English summary.

The author describes experiments carried out with the object of ascertaining whether *Toxoplasma gondii* can be transmitted congenitally by rats with a latent infection. The animals used for this purpose were

first tested serologically for the absence of natural infections, after which the females were inoculated intraperitoneally with the peritoneal exudate of infected mice. They were mated with normal males at different periods before and after infection, in order to produce pregnancy at various stages of the disease, and to study transmission to the foetuses during the acute and chronic phases of toxoplasmosis. In view of the possibility that congenital transmission might occur in subsequent generations, some of the females were observed after the second and third pregnancies, and in some cases they were treated with cortisone.

The presence of toxoplasmosis in the offspring was detected by sub-inoculation of mice with organs of those young rats that showed signs of the disease, *e.g.*, stillborn animals, those that died during observation and those that reacted positively to serological tests.

Congenital infection with *Toxoplasma* was highest (7·25%) in the offspring of females infected between the fourth and seventeenth days of pregnancy. However, in 2 cases (0·43%) there was evidence that congenital transmission was produced from mothers with a chronic latent infection. It was also shown that such infections were not reactivated either by subsequent pregnancies or by administration of cortisone during pregnancy. *C. A. Hoare*

DERMATOLOGY AND FUNGUS DISEASES

Smith, J. G., Jr., Humbert, W. C. & Olansky, S. **Followup of Blastomycin Sensitivity in an Epidemic Area.** *Pub. Health Rep.* Wash. 1958, July, v. 73, No. 7, 610–14.

" To examine further the reactivity of healthy individuals in a blastomycosis epidemic area to the blastomycin and histoplasmin skin tests, a second survey was conducted in the area of Grifton in Pitt County, N. C., in May 1956. It included 43 of the 83 persons who had had positive blastomycin skin tests or positive blastomycosis complement fixation tests in a survey in April 1954.

" In the 2-year period, 34·8 percent of the previously positive blastomycin skin test reactors had reverted to negative, and 91 percent with previously positive complement fixation to blastomycosis were now negative. No conversions to positive blastomycin skin tests were found in the selected group included in this survey, but two individuals previously negative to the blastomycosis complement fixation test were found to be positive.

" Both skin sensitivity to blastomycin and blastomycosis complement-fixing antibodies tended to decrease in the 2-year period, but the complement-fixing antibodies disappeared in a higher percentage of the individuals tested.

" Seven persons became reactive to the histoplasmin skin test and three lost their reactivity. The loss of reactivity in one instance might possibly represent cross-reactivity to the blastomycin skin test. None of the group surveyed had a positive histoplasmosis complement fixation test."
[See this *Bulletin*, 1958, v. 55, 319.]

HEAT STROKE AND ALLIED CONDITIONS

Smith, F. E. **Climate and Health in the Royal Navy.** *Brit. J. Indust. Med.* 1958, July, v. 15, No. 3, 197–203, 3 figs.

A previous survey has shown that the percentage of Royal Naval ships' companies on the attending list (minor ailments) increased as the weather became hotter, especially when the temperature was greater than 80°F. on the upper deck at noon [this *Bulletin*, 1953, v. 50, 1077].

Between October 1948 and September 1952 minor ailments again showed an increase with upper deck temperature from 3% of ships' companies at 60°F., to 5% at 80°F. and 9% at 90°F. Skin disease accounted for 30% of all minor ailments in temperate waters and for nearly half of it in hot climates.

The effect of air conditioning two sloops in the Persian Gulf was to decrease the attending list from 11% to 7% of the ships' companies.

M. L. Thomson

Leithead, C. S., Guthrie, J., de la Place, S. & Maegraith, B. **Incidence, Aetiology, and Prevention of Heat Illness on Ships in the Persian Gulf.** *Lancet.* 1958, July 19, 109–15, 2 figs. [Numerous refs.]

Each month about 14,000 sailors from some 240 tankers call at Kuwait for oil. This operation is carried out at environmental shade temperatures during the summer months of 95–120°F. (35–49°C.) dry-bulb and 60–90°F. (15–32°C.) wet-bulb. This paper reports 128 cases of heat illness (1 in 850 of those at risk) arising in the summers of 1956 and 1957 in tanker crews.

There were 3 cases of heat hyperpyrexia with absence of sweating and a rise in body temperature above 106°F. One of these patients died: another was probably saved by being promptly put in the meat-storage space at low temperature. 5 patients with borderline heat hyperpyrexia had temperatures between 103 and 106°F. (39·5–41°C.). All were sweating, and urine and blood electrolyte (where examined) were within normal limits. Anhidrotic heat exhaustion was encountered only once

because several months are required for its development. Salt-deficiency heat exhaustion occurred in 59 persons, with absence of urinary chloride, reduction in blood chloride, muscle cramps and oligaemic shock. 3 of these required 40 gm. of NaCl per day before urinary NaCl exceeded 1 gm./l.

Heat illness was three times as common in the engine room, and twice as common in the galley, as on deck.

Oil tankers spend 3 weeks in a cool environment on each trip and, therefore, on entering the Persian Gulf the crews had lost such acclimatization to heat as was gained on previous trips. Breakdown usually occurred within 5 days of entering the heat, *i.e.*, before acclimatization was acquired.

It was concluded that dietary salt intake must have been inadequate—sweat losses must have been 6 litres or so and salt losses 12–16 gm. during a 4-hour shift. There was no evidence of water deficiency in these patients.

In 7 cases, syphilis, virus pneumonia, enteritis, appendicitis and malaria were also present.

Heat casualties may be predicted among these working men at wet-bulb temperatures above 90°F. (32°C.), or at sustained dry-bulb temperatures above 110°F. (43°C.), or 86°F. (30°C.) or higher on the effective temperature scale. Where the temperature in working spaces cannot be kept below these temperatures, much may be done to prevent heat casualties by limiting physical activity, staggering exposure, increasing salt intake and generally watching for early signs of heat distress. *M. L. Thomson*

Baxter, C. R. & Teschan, P. E. **Atypical Heat Stroke, with Hypernatremia, Acute Renal Failure, and Fulminating Potassium Intoxication.** *Arch. Intern. Med.* 1958, June, v. 101, No. 6, 1040–50, 3 figs. [25 refs.]

This paper describes 3 fatal cases of heat injury with pyrexia which did not, so far as is known, exceed 106°F. These occurred in white army recruits in South Texas at ambient temperature 103°F. [quoted for one patient only].

All patients presented with behavioural abnormality and all showed shock, oliguria and terminal potassium intoxication. The blood pressure (BP) was initially 80/60 in one patient and was unobtainable in another. Treatment with laevo-arterenol and intravenous (IV) fluids restored blood pressure only transiently: in one patient laevo-arterenol was administered too early, promoting vasoconstriction and impairing heat loss.

Classical symptoms of heat exhaustion with muscle cramps were present in one patient and were treated with intravenous NaCl solution.

This did not relieve symptoms, however, but caused hypernatraemia associated with intracellular dehydration.

Increasing hyperkalaemia was treated by artificial kidney and ion-exchange resins. *M. L. Thomson*

MISCELLANEOUS DISEASES

PEDIATRICS. Springfield, Ill. 1958, Aug., v. 22. No. 2, 375–94. [Numerous refs.] **Symposium: Animals and Disease.** [i] **Introductory Remarks** [TOP, F. H., Chairman], 375–6. [ii] **Cat Scratch Disease** [WENTWORTH, F. H.], 376–9. [iii] **Animal Parasites and Human Diseases** [BEAVER, P. C.], 380–84. [iv] **Rickettsial Diseases of Animals transmissible to Children** [LUOTO, L.], 384–7. [v] **Epidemiologic Aspects of Leptospirosis** [STEELE, J. H.], 387–94.

CHARMOT, G., SANDOR, G. & VARGUES, R. Recherche de macroglobulinémie dans 11 cas de dysprotéinémie observés en Afrique Equatoriale. [**A Search for Macro-Globulinaemia in 11 Cases of Dysproteinaemia seen in French Equatorial Africa**] *Bull. Acad. Nat. Méd.* 1958, v. 142, Nos. 23/24, 607–10.

By the simple test of adding serum to distilled water and noting whether a precipitate was formed the authors were able to discover 11 patients with a "dysproteinaemia" in Brazzaville. In such sera the gamma globulins are raised and the albumin is low. When the protein fractions were examined in an ultracentrifuge it was found that 5 of them contained an abnormal proportion of very large globulins (more than 10%). The upper limit in normals is 3%, and this was slightly exceeded in 3 of the remaining 6, and just reached in the other 3 patients. Although there was chemically a macroglobulinaemia, the clinical condition of the patients who were young and did not suffer from haemorrhages was different from the typical macroglobulinaemia described by Waldenström, also the macroglobulins were gamma globulins, whereas in Waldenström's condition they are beta 2 globulins. No specific cause can be associated with the macroglobulinaemia of the African patients, 2 of the patients with definite macroglobulinaemia suffered from trypanosomiasis but no bacteriological or parasitological aetiology could be eliminated in the other 3. *H. Lehmann*

See also p. 1356, BUCKLEY, **Tropical Pulmonary Eosinophilia in relation to Filarial Infections (*Wuchereria* spp.) of Animals.**

Lanzo, A. Eosinofilia tropicale in Eritrea. [**Tropical Eosinophilia in Eritrea**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1958, Apr., v. 39, No. 4, 249–52. English summary (4 lines).

Rajam, R. V. & Mahadevan, R. **Chronic Migrating Subcutaneous Eosinophilic Granuloma caused by Unidentified Larvae of a Myiasis-Producing Fly.** *J. Indian Med. Ass.* 1958, July 16, v. 31, No. 2, 73–80, 7 figs. on 2 pls.

"An unusual case of chronic migrating eosinophilic granuloma affecting the cutaneous and subcutaneous tissues of the right lower limb is presented. From the histopathological studies of the stained sections of the granuloma, there is a reasonably strong suspicion that the disease is caused by dipterous larvae of a specific myiasis-producing fly. The identity of the parasite could not be established by the authors. The empirical treatment with a multiplicity of drugs together with the anti-diabetic therapy, failed to arrest or alleviate the infection."

Prates, M. D. **Malignant Neoplasms in Mozambique. A Frequency Ratio Survey from 1944—December 31, 1957 and a Comparison with other Parts of Africa.** *Brit. J. Cancer.* 1958, June, v. 12, No. 2, 177–94. [15 refs.]

An analysis has been made of 1,977 malignant neoplasms diagnosed at autopsy or by histological examination in a 13-year period. Data for 1,606 of these were collected from existing hospital records in the 12 years prior to the middle of 1956. In May 1956 a cancer survey unit was established and in the next 19 months 371 malignant tumours were diagnosed including 161 among a population of approximately 100,000 Africans living in the locality of the hospital.

Comparisons are made of the proportions of cancers arising from different sites among the European and African populations and between the cases in Africans diagnosed during the whole period, during the period following the establishment of the survey unit and in the subgroup of Africans living in the vicinity of the hospital. These last comparisons show no striking differences between the populations in any of the 3 African series. The total data are set out in a Table showing separately the numbers occurring in Africans and Europeans by sex, age and site. The outstanding observations are:

(1) a very high proportion of primary liver cancer among the Africans

(2) a relatively greater frequency of cancer of the cervix uteri compared with cancer of the corpus in Africans

(3) a relatively low proportion of breast cancers among African women

(4) a relatively high proportion of skin cancer among European men and a different distribution of histological types between Europeans and Africans, and

(5) relatively low proportions of cancer of the lung, oesphagus, stomach, large bowel and rectum among the Africans.

The data from Africans in Mozambique are compared in a series of Tables with the data reported for Africans in 5 other parts of the continent; it is found that in all series there are several outstanding similarities (*i.e.*, high proportions of cancer of the liver and cervix uteri), but that there are also substantial differences. Cancer in Mozambique appears to be characterized by a particularly high proportion arising in the liver and bladder. *Richard Doll*

MARSDEN, A. T. H. **The Geographical Pathology of Cancer in Malaya.** *Brit. J. Cancer.* 1958, June, v. 12, No. 2, 161–76, 4 figs. [11 refs.]

Malaya provides particular opportunities for the study of the geographical pathology of cancer, since it contains large communities of Malays, Chinese and Indians and the distributions of the different types of cancer in these communities can be compared with one another and with the distributions found nationally in China and India.

The data for the present study consist of 4,650 consecutive cases of cancer diagnosed microscopically from biopsy specimens sent to one Institute. The cases are not fully representative of those which occur in Malaya since (a) biopsy is performed more readily on the more accessible cancers, (b) nearly all Indians and most Chinese seek medical treatment at some stage of a serious illness but Malays are reluctant to enter hospital and are averse to surgery and (c) urban patients are probably represented disproportionately and the Malay population is nearly all rural. The age distribution of cancer is similar in all the 3 races, but even after the age composition of the population is taken into account it is found that the proportion of cancers occurring under 60 years of age is more than in Western countries; it is thought that this is mainly due to the predominance of some cancers which occur characteristically at an early age and to the early exposure to some specific carcinogens (*e.g.*, in betel chewing). The basic data are set out in a Table showing the numbers of cases by race, sex and site and an attempt is made to relate the main peculiarities to known differences in exposure to environmental carcinogens or to variations in genetic susceptibility. Some of these peculiarities are:—

(1) A high proportion of oral cancer among Indians who alone chew a combination of betel and tobacco.

(2) A fairly high proportion of cancer of the oesophagus among Chinese men, who alone consume large quantities of strong spirits.

(3) A low proportion of colonic and rectal cancer among all 3 races.

(4) A high proportion of hepato-cellular cancer of the liver among Chinese men; this can hardly be attributed to malnutrition but it is closely associated with a post-necrotic hepatic cirrhosis occurring early in life.

(5) A high proportion of cancer of the naso-pharynx in Chinese and Malays.

(6) A curiously uniform histological type of breast cancer in all 3 races, characterized by the absence of fibrous tissue. No typical scirrhous carcinomas were seen in 300 specimens.

(7) A deficiency of cancer of the uterus among Malayan women; this is unlikely to be due to the circumcision of the Malayan male, since the ratio of cervix to corpus cancer is unaltered.

(8) An unusually high proportion of choriocarcinoma among Chinese (and possibly Malay) women.

(9) A much lower proportion of penile cancer among the circumcised Malay men.

[These data are of considerable interest, but the unequal representation of all types of cancer in the different racial groups makes it necessary to be very cautious in interpreting the results.] *Richard Doll*

PARASITOLOGY: GENERAL

Soc. Protozoologists: **Committee on Cultures** [Provasoli, L., Chairman]. **A Catalogue of Laboratory Strains of Free-Living and Parasitic Protozoa (with Sources from which they may be obtained and Directions for their Maintenance).** *J. Protozoology.* Utica. 1958, Feb., v. 5, No. 1, 1–38. [Numerous refs.]

The Society of Protozoologists in the United States has performed a valuable service in compiling a catalogue of strains of free-living and parasitic protozoa maintained in various laboratories throughout the world. The publication of this directory will enable workers interested in any particular strains to obtain them from these sources *gratis* or at a nominal charge.

The strains are listed in the systematic order of the organisms and the following information is provided for each: (1) type of culture or (in the case of parasites) hosts in which it is maintained, (2) name of worker who first isolated it, (3) sources from which the strain can be obtained, (4) indication and description of suitable medium or host for its maintenance, (5) selected references to the relevant literature.

The strains named in the catalogue include most of the species of parasitic protozoa of medical and veterinary importance. Workers who keep strains of protozoa not mentioned in this catalogue are urged to deposit them in a Culture Collection, so that they are made available to others.

Reprints of this catalogue can be bought for $1 from the Treasurer of the Society, Dr. D. M. Lilly, Department of Biology, St. John's University, Jamaica 32, New York, U.S.A. *C. A. Hoare*

Bailey, V. M., with the technical assistance of F. Khamis. **An Intestinal Parasite Survey in a Rural District of Baghdad.** *Bull. Endem. Dis.* Baghdad. 1958, Jan., v. 2, Nos. 3/4, 148–51.

The author made a stool survey of 281 persons out of a population of 370 in a rural area 40 miles from Baghdad. The inhabitants are principally farmers living in scattered villages of mud huts. The climate is typical of an arid area. Specimens were collected from a clinic and 2 villages, by the MIFC method, and were examined within 1 to 48 hours.

The results are shown in 3 tables indicating (1) total incidence, (2) incidence in adults, (3) incidence in children. 72·5% were positive and these included *Entamoeba histolytica* (20·37%), *Giardia* (2·14%), *Ancylostoma duodenale* (54·8%) and *Ascaris* (19·61%).

In adults, females (78·67%) showed rather more positive results than males (70·01%). In children, this finding was reversed (63·9% and 75·51% respectively).

The relative high incidence of amoebae and hookworm reflects the socio-economic and sanitary conditions of the area.

H. J. O'D. Burke-Gaffney

Ludvík, J. Elektronenoptische Befunde zur Morphologie der Sarcosporidien (*Sarcocystis tenella* Railliet 1886). [**Electron Microscopical Examinations of Sarcosporidia (*Sarcocystis tenella* Railliet 1886)**] *Zent. f. Bakt.* I. Abt. Orig. 1958, v. 172, Nos. 3/4, 330–50, 17 figs. [16 (1 coloured) on 8 pls.]

The English summary appended to the paper is as follows:—

"The cells of Sarcocystis tenella, the cell surface, the nucleus, the mitochondria and other parts were described after comparative microscopical and electron microscopical examination. The cell division of S. tenella is described. Cytochemical studies were performed."

[See this *Bulletin*, 1956, v. 53, 1167.]

Kunz, C. Fluoreszenz-serologische Untersuchungen zum Nachweis von Candida albicans-Antigen bei Frühgeburtenpneumonien. [**Fluorescence-Serological Examinations for Demonstration of *Candida albicans* Antigen in Pneumonia of Premature Infants**] *Zent. f. Bakt.* 1958, v. 172, No. 5/6, 446–8.

"The lungs of three infants which died of i. p. p. [pneumonia of premature infants] and two of which revealed candida albicans, were examined with a rabbit immune serum, labelled with fluorescein, directed against this fungus. It could not be demonstrated that the pneumocysts in these lungs are cells of candida albicans."

[See this *Bulletin*, 1956, v. 53, 668.]

Richardson, U. F. & Kendall, S. B., **Veterinary Protozoology.**

This book was reviewed on p. 1299.

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Deduit, Yolande. Etudes sur la ponte par autogénèse des culicides. III.—Données numériques sur l'acte de ponte chez la femelle fécondée de *Culex pipiens autogenicus* Roubaud (plusieurs femelles avec un mâle). [**Study of Autogenetic Oviposition in Mosquitoes. III. Statistical Data relating to Oviposition in the Fertilized Female *Culex pipiens autogenicus* (Several Females with One Male)**] *C.R. Soc. Biol.* 1957, v. 151, No. 11, 1954–6.

This is a continuation of work described previously [this *Bulletin*, 1956, v. 53, 377; 1958, v. 55, 702]. Again it has been shown that more eggs are produced and laid by larger (as measured by wing length) than by smaller females. There was no apparent difference between the oviposition of single females kept with single males and that recorded when 4 females together shared a single male. More partial ovipositions (32%) were observed in unmated females compared with mated females (2–8%).

B. R. Laurence

Kitzmiller, J. B. **X-Ray Induced Mutation in the Mosquito, *Culex fatigans*.** *Exper. Parasit.* New York. 1958, July, v. 7, No. 4, 439–62, 1 diagram & 12 figs. on pl. [18 refs.]

" X-ray treatment of *Culex fatigans* males with 2820 r produced variation recoverable in the F_3 progeny of these treated males. Many variants could not be established in stocks and are arbitrarily designated as ' non-genetic '; they are herein described. Seven variants have been established in laboratory stocks:

" *Four-jointed.* An autosomal recessive which adds a fourth joint to the maxillary palpus.

" *Scale row.* An autosomal recessive whose principal effect is the addition of an extra row of scales between veins r_1 and r_2.

" *Cubital scales.* An autosomal recessive which adds an extra patch of scales in the cubital area.

"*Closed R_2 cell.* Probably sex-linked, of irregular behavior. Causes fusion of veins r_2 and r_3 before the wing margin.

"*Clubbed palpi.* Two mutants, one of which affects both palpi, the other of which affects only one. Not definitely distinct; of irregular genetic behavior.

"*Spotted wings.* Probably an irregular dominant which adds a dark spot of about 30 long scales in the area of the 3–4 cross vein.

"A mutation rate of 9% (probably minimal) and the frequent appearance of parallel mutations pose problems of theoretical interest in the study of mutation, and suggest that mosquitoes may be valuable tools for these studies."

MARTINS, A. V., FALCÃO, A. L. & DA SILVA, J. E. Estudos sôbre os flebótomos do Estado de Minas Gerais—I. *Phlebotomus renei* n. sp. (Diptera, Psychodidae). [**Studies on *Phlebotomus* in the State of Minas Gerais. I.** *Phlebotomus renei*, **n.sp.**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1957, July, v. 9, No. 3, 321–5, 7 figs. English summary (4 lines).

BERGMANN, E. D., LEVINSON, Z. H. & MECHOULAM, R. **The Toxicity of *Veratrum* and *Solanum* alkaloids to Housefly Larvae.** *J. Insect. Physiol.* London. 1958, Aug., v. 2, No. 3, 162–77, 1 fig. [38 refs.]

HORNSTEIN, I., SULLIVAN, W. N. & MURPHY, R. **Fumigation Properties of Dow ET-57.** *J. Econom. Entom.* 1958, June, v. 51, No. 3, 408–9.

The possibility of incorporating a fibre-glass screen impregnated with lindane into the air conditioning system of an aircraft as a method of fumigation was considered in a previous paper [this *Bulletin*, 1954, v. 51, 233]. Dow ET-57 has a relatively low mammalian toxicity and consequently may be more suitable. The experiments were conducted in an aircraft fuselage in which air was passed through a fibre-glass air conditioning filter (16 × 20 × 1 inches) impregnated with 25 gm. of fumigant. All caged *Musca* and *Aëdes aegypti* were killed after exposure for one hour at 25–27°C. With *Tribolium* and cockroaches, complete kills were obtained after four hours at 24–33°C. and 33–46°C., respectively. Complete knockdown of *Musca* and *Aëdes* flying freely was obtained after one hour at 25–27°C. and 33–46°C., respectively. A 50-fold increase was recorded in the concentration of fumigant in the air

from 15°C. to 45°C. and the concentration of ET-57 in the air at temperatures above 25°C. may be too high for practical use. Further tests are contemplated. *B. R. Laurence*

Dethier, V. G. & Arab, Y. M. **Effect of Temperature on the Contact Chemoreceptors of the Blowfly.** *J. Insect. Physiol.* London. 1958, Aug., v. 2, No. 3, 153–61, 2 figs. (1 on pl.). [15 refs.]

Supple, C. J. **Genitourinary Myiasis due to** *Eristalis tenax*. **Report of a Case.** *J. Amer. Med. Ass.* 1958, Aug. 9, v. 167, No. 15, 1838–9, 1 fig. [10 refs.]

Mazidis, S. P. & Xirocostas, C. [Un cas de myiase oculaire due aux larves du diptère *Oestrus ovis*.] [**A Case of Ocular Myiasis due to Larvae of** *Oestrus ovis*] *Acta Microbiologica Hellenica.* Athens. 1958, Mar.–June, v. 3, Nos. 2/3, 89–99. [11 refs.] [In Greek.] French summary.

Lapierre, J. Myiase cutanée à *Hypoderma bovis*. Effets de la corticothérapie sur l'éosinophilie. [**Cutaneous Myiasis due to** *Hypoderma bovis*. **Effect of Cortisone Therapy on the Eosinophilia**] *Bull. Soc. Path. Exot.* 1958, Mar.–Apr., v. 51, No. 2, 232–8.

A woman of 45 years of age from Brittany, with recent painful nodules in the neck, was considered to have an eosinophilic leukaemia on account of blood counts and myelogram. She was treated with cortisone in preference to radiotherapy. The nodules became less painful and the eosinophil count fell somewhat. After 2 months, she discharged the first of 5 third-stage larvae of *Hypoderma bovis*, the remainder issuing during the next 12 days. The administration of cortisone was stopped, but as the eosinophil count remained high it was given again for 2 months, by which time the count had fallen to normal. *W. E. Kershaw*

See also p. 1381, Rajam & Mahadevan, **Chronic Migrating Subcutaneous Eosinophilic Granuloma caused by Unidentified Larvae of a Myiasis-Producing Fly.**

Blancou, L. Notes biogéographiques sur les mammifères de l'A.E.F. [**Biogeographic Notes on the Mammals of French Equatorial Africa**] *Bull. Inst. d'Etudes Centrafricaines.* (n.s.) 1958, Nos. 15/16, 7–42, 8 figs. [16 refs.]

SETZER, H. W. **The Jerboas of Egypt.** *J. Egyptian Pub. Health Ass.* 1958, v. 33, No. 3, 87–94.

This is a corrected version of the paper, the title of which appeared in this *Bulletin*, 1958, v. 55, 225.

WARNER, D. W. & BEER, J. R. **Birds and Mammals of the Mesa de San Diego, Puebla, Mexico.** *Acta Zool. Mexicana.* 1957, Dec. 15, v. 2, Nos. 4/5, 1–21.

We have learned with deep regret of the death on 24th October, 1958, of Major-General Sir JOHN WALLACE DICK MEGAW, *K.C.I.E.*, D.Sc., M.B., B.Ch., I.M.S. (retd.). He was a Member of the Honorary Managing Committee of the Bureau of Hygiene and Tropical Diseases from 1936 to 1939, and from 1941 to 1958 he contributed to this *Bulletin* an outstanding series of abstracts and reviews of papers on the typhus group of fevers.

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